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SCIENTIFIC GEOGRAPHY: THE RELATION OF ITS CONTENT TO ITS SUBDIVISIONS

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The Criticism of Geography: It should not be possible for any one to say seriously, as was said recently before the British Associa-

tion, that "students of geography are embarrassed by the fact that there is no concensus of opinion as regards either subject matter or method."* Yet a leading English geographer pointed out not very long ago that "the chief problem of geography at present is the definition of geography;"† and, it might be added, the second problem is to fix the respective spheres of its logical subdivisions according to that definition of the whole subject.

That these things should be done is desirable, since many individuals stoutly maintain that geography is not a science at all, and, perhaps with some justification, claim that geographers do not seem to know what geography is and what it is not. In most cases both these contentions are supported by the argument that geography as it is taught and written is not developed about any definite central theory, but that it is merely a "heterogeneous agglomeration of dissociated items" or scraps of information, which are dealt with more elaborately and in a truly scientific manner by astronomers, geologists, zoölogists, botanists, historians, and the like.

Logical Concept Needed: The objections raised against geography, where they are justified at all, are usually based on the character of studies and teaching by those whose geographical training has been inadequate, or who have not formulated any clear or logical concept of what the subject really is. It was pointed out some time ago by Davis that, "we may often benefit by systematically setting forth the place of our individual studies in geography as a whole . . . But it is manifest if we should attempt to make exposition of our ideas concerning the relation of our own studies to the whole subject, we must have previously gained a tolerably definite idea of the nature of the whole."‡ The failure to recognize the significance of that statement furnishes the explanation for much of the trouble encountered by geography, since with an erroneous concept of geography as a whole, it is certain that there will be erroneous interpretations of any particular phase of the subject, and a misuse of items under that head.

Value of a concept with a central theory. To Geography as a Science: If the two contentions of the critics of geography are considered in detail, it appears that both can be rendered unfounded, without much difficulty, and with no damage to the subject. The main contention that geography is not sciencne at all, but merely a grouping of dissociated items, is no longer tenable, if all its items are

* Hoke, G. W. *Scot. Geog. Mag.*, 1907, p. 64.

† Mill, H. R. *Bull.* Amer. Geog. Soc., vol. 36, p. 658.

‡ Davis, W. M. *Jour. Geog.*, April, 1906, p. 145.

selected with reference to, and developed about, a central theory, into a logical, coherent whole. To accomplish that end geographers as a body must adopt some one scientific concept of the subject and develop it uniformly along that line of thought.

The second contention, that geographers deal with many items which belong to, and are more adequately treated in, other sciences, can perhaps never be eliminated entirely. Apparent overlapping, one subject with another, is likely to exist always in the case of closely related fields, but it usually does not occur to the critics of geography that the so-called borrowing is not all one-sided. Thus if the geographer were to read out from history all matters concerning location, extent, distribution, climate, surface form, population, products, and so on, as belonging to him alone, history as an intelligible study, would be dealt a crippling blow. If the same process were applied to zoölogy and botany those subjects would be reduced practically to systematic morphology and embryology, and the theory of evolution, like the whole important field of ecology, would have no basis on which to stand. Political science and economics could not be taught at all except in their theoretical and abstract aspects. Duplication to some extent is unavoidable, but it is essential to recognize that it is duplication merely in the thing used, not in the method of treating that thing or in the use to which it is put. Thus the second contention likewise can be rendered unfounded by the same course as will remove the first—that is, by the establishment of a concept of geography which gives it a central idea or theory, and by building around that theory a structure of items, every one of which harmonizes with the theory and may be grouped with reference to its particular bearing on the whole subject.

In expansion of the subject: Geography is steadily receiving more recognition in this country, and as its recognition increases, the subject is constantly expanded to meet the new demands put on it as a background for all the humanitarian studies. This rapid broadening of the field of work presents a main cause for the contention that geography "lacks the coherence essential to a science that is to hold together," for in its expansion, geography as a science has suffered at the hands of those. who, with little or no interest in the subject as a whole, have asked it to do too much in special fields. It is apparently only by the general adoption of some one concept of geography that the exact sphere of the growing subject may be clearly indicated, and the subject saved from those over-zealous friends who would have it do everything. In the light of such a concept, the separate fields of geographical study may then be marked out in a

way which will indicate what is and what is not to be grouped under their heads.

Concepts of geography. The non-geographic: In seeking for a concept of geography which will make it possible to develop the subject as a true science, it may be profitable, from among the multitude advanced, to begin with the statement of a concept which is confused and illogical, and which represents fairly the attitude of many of those not entitled to the name of geographer. One of the most elaborate discussions of geography, by an economist, presents the idea that "systematic geography constitutes a series of descriptive studies of *natural phenomena.*"* This concept of "descriptive studies" is expanded somewhat by the subsequent statements that "botanical geography . . . describes the distribution of plants," "zoögeography describes the distribution of animals," and "anthropogeography . . . describes the distribution of mankind." Apparently, therefore, the series of descriptive studies of natural phenomena which constitute geography are concerned simply with the *"distribution"* of plants, animals, and man. But immediately thereafter the writer advances the astounding criticism that "for a descriptive study of *human activities* no category is apparently provided,—unless, perhaps, anthropogeography can be stretched out sufficiently to serve." The concept of geography implied in this last statement obviously discards the idea of natural phenomena, as expressed in the earlier definition, and shifts from the idea of simple *distribution in space* for the plants and lower animals to the idea of the complete description of the *activities* of the highest animal, man. Such a mixed concept can lead only to confusion in the mind of author and reader alike, aside from all question whether geography is "descriptive," whether it is concerned mainly with the "description of distributions," or whether all "human activities" must be covered by the subject.

The persistence of such concepts, however, is one of the fundamental causes for much of the criticism directed against the study as it stands to-day, since with the wrong concept in regard to the whole subject, contributions to geography, the teaching of it, the delimitation of its different fields, and even the criticism of it cannot be done intelligently. It is one of the duties of geographers as a group to adopt so definite a stand in regard to what their subject undertakes to do, that such mistaken concepts can no longer persist.

The distribution concept: Among geographers themselves it has been said that "all are agreed that the subject matter of geography

* Keasbey, L. M. *Pol. Sci. Quart.*, 1901, p. 83. (Italics are mine.)

is the surface of the earth together with what is found on that surface, and there is further general agreement in the view that it includes as an essential part an inquiry into causes affecting these things."* In spite of this "general agreement," however, there is apparent difference of opinion on the two sides of the Atlantic, with some in this country leaning toward the European idea. The line of division is concerning the attitude to be adopted in treating "the surface of the earth and what is found on that surface."

European geographers make the central thought "distribution in space" as may be indicated by representative continental and English definitions. Hettner, whose recent concept may be taken as representative of the modern continental group, makes geography "the science of the arrangement of things in space on the earth."† Except in phraseology this definition differs little from the statement by Mill that "geography is the science which deals with the forms of relief of the earth's crust and with the influence which these forms exercise on the distribution of all other phenomena."‡

The best criticism of these "distribution" concepts of geography is found in the answer that "location and distribution must always be important elements in geography" but that if geography is only the science of distribution, it becomes "merely the regional aspect of other subjects" and it is, therefore, "hardly worth while to maintain the study of geography apart from that of the subjects whose regional aspect it considers."§ No unifying principle in the form of an adequate central theory is contained in the concept of geography as distribution alone, hence there is no basis on which it may be made either coherent or logically systematic. Geography as a purely descriptive study of distributions, therefore, has nothing which can justify a claim to rank as a separate science.

The relationship concept: An adequate central idea or theory which does unify the subject, is found in the concept furnished by Davis, who says "the whole content of geography is the study of the relation of the earth and its inhabitants" or "the study of the relation of the earth and life."‖ This concept is perhaps the one held most generally by American geographers, as having the evident advantage of giving coherence, and of setting a logical limit, to the field of geography, since those things, and only those things, which enter into relationship with the earth are rightfully to be considered.

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* Chisholm, G. G. *Scot. Geog. Mag.*, 1908, p. 565.
† *Geog. Zeitschrift*, XI, 1905, p. 554.
‡ Mill. *Scot. Geog. Mag.*, 1901, p. 508.
§ Davis. *Jour. Geog.*, 1906, pp. 149–150.
‖ Davis. *Proc.* Am. Phil. Soc., XLI, No. 170, 1902, p. 239.

The idea that the essential principle of geography is relationship between the physical environment and the environed organism is criticized by English geographers and by a few in this country as leaving out "the consideration of place; an essential consideration in geography."* This criticism, however, finds justification only in an unwarranted narrow interpretation of the original definition, since obviously the question of distribution is one of the fundamental points in the study of the relation of the earth to life, wherever that distribution, or place consideration, has any relation to the environment. If, on the other hand, the study of distribution in geography is not limited to those things whose place relations are concerned with natural phenomena, geography is reduced to absurdity and can be held accountable for the place relations of all human activities, even to the distribution of musical instruments and works of art.

That the relationship concept really gives no foundation for the contention that it ignores place, appears in a later discussion, where it is said, "any statement is of geographical quality, if it contains a reasonable relation between some inorganic element of the earth on which we live, acting as a control, and some fact concerning the existence or growth or behavior or distribution of the earth's organic inhabitants, acting as a response."† Thus the idea that geography is the study of the relation of the earth to life makes full allowance for all that the European concept of distribution can logically claim. In addition it changes the emphasis from mere description to scientific explanation, broadens the field materially, yet sets definite bounds for it, and perhaps most important of all, it provides the unifying principle of relationship, about which the subject may be developed as a true, organized science.

The further objection that the aim of geography is concerned more especially with human life, rather than with life in general, as directly implied in Davis's definition, cannot be raised seriously, since those who insist on the super-importance of the man element in geography lose nothing by adopting the broader concept. The human relations may be studied just as readily and just as exhaustively as a special field of the broader subject, and at the same time they may receive material assistance in their own statement by the development of allied fields in connection with other forms of life.

Finally, the objection that such a broad concept makes the subject too vast for any one man to handle is no discredit to geography as a

* Chisholm. *Scot. Geog. Mag.*, 1908, p. 571.
† Davis. *Jour. Geog.*, April, 1906, p. 149.

science, any more than it discredits chemistry to have workers in the special fields of organic, inorganic, physical and even physiological chemistry. Because of its many-sided relations the content of geography is perhaps more complex than that of most other sciences, and hence likely to be marked by more subdivisions and separate fields of study. But it is more desirable, than otherwise, that there should be recognized special phases of geography for which special training is required. Under such conditions the whole science can much more readily be advanced, if those special phases are developed, first, according to a common concept of the whole subject, and, second, with a proper understanding of the logical relation of each phase to its fellows.

Significance of relationship: Accepting the relationship concept of geography it appears possible to define the provinces of the various specialized fields of geography with a degree of clearness not attainable under the narrower distribution idea. At the same time it is possible to indicate the relation of the different fields to the whole subject and to each other, and to arrange them all in an orderly system or logical grouping, such that, when each field has been developed to its full extent, the result will represent the complete structure of a systematic, unified science of geography. Such a definition and grouping of the special phases of geography seems to be the only way to free the subject from the many criticisms directed against it, and above all to demonstrate clearly that geography, properly interpreted, is a coherent science, capable of standing on its own merits.

General divisions of geography under relationship concept: The first natural line of division in geography lies in the recognition that one side deals with the inorganic environment and the other with the organic responses. The line of cleavage between these two sides is sharp enough so that there is little room for question regarding their relative spheres. Each side, however, is so broad that it, too, is capable of being split into various subdivisions, any one of which may be made the sole subject of individual study. Designating the whole inorganic side by the comprehensive term, physiography, and the entire organic side by the corresponding term, ontography, the special subdivisions of each may be regarded in their relation to each other, to these main divisions of the subject and to scientific geography as a whole.

Physiography and its subdivisions: So far as the inorganic side is concerned, the content and subdivisions of the subject are readily marked out according to a natural four-fold grouping. Thus there

are the three chief elements of the physical environment, to which responses may be made, the land, the air, and the water. To these three must be added the fourth group of conditions which may induce separate responses of life, namely, those earth relations which are the result of the earth being a member of the solar system, and which are usually collected under the unsatisfactory name of mathematical geography. It is, however, in itself, not a "geography" at all, nor is it mathematical, beyond the fact that recourse is had to mathematics in explaining some of the items. The use of such a term for a sub-head of physiography is entirely illogical, and hence some better term may be sought. It may be suggested that *geoplanetology,* or the study of the earth as a planet, would be a more appropriate designation, since it is really the planetary aspects of the earth which are the chief aim of the study. This term has the added advantage of being uniform in character with the adopted names of the associated studies. Furthermore, under the head of the planetary aspects of the earth, place may be found for the logical grouping of certain items, such for example, as the arrangement of land and water, which mathematical geography does not include, and which can not be readily placed under the head of the physiography of the lands. Meteorology, oceanography, and physiography of the lands, represent the three other phases of general physiography.

The logical grouping: In erecting the system in which these four divisions are to stand in logical relation one to another, certain conditions of inter-relationship make an absolutely logical progression impossible. Thus the study of ocean currents under the head of oceanography involves in their complete explanation a previous understanding of certain phenomena of the atmosphere, especially winds. The study of the physiography of the lands is dependent on meteorology for the full explanation of some of its important aspects, while in turn, meteorological phenomena are to a certain extent influenced by land and water conditions. The grouping which is adopted, therefore, must be the one which does least violence to the inter-dependent features of the subject.

It is obvious that the group of planetary earth relations, or geoplanetology, is independent of the others, so far as its own things are considered, whereas both meteorology and oceanography depend upon it in several important particulars. Hence it may be regarded as the basis from which the system is to start. Meteorology especially bears an intimate relationship to the planetary qualities of the earth, its phenomena are more nearly planetary, and it is necessary for the explanation of some aspects of both oceanography and physi-

ography of the lands. For that reason the study of meteorology is logically the second sub-head under the general subject physiography. Oceanography, through tides related to the planetary aspects, and through waves, currents and so on related to meteorology, is somewhat closer to both these than is the study of land forms. Consequently, oceanography and the physiography of the lands stand third and fourth respectively in formulating the order for the consideration of the special fields of physiography with reference to a logical system of scientific geography.

It must be recognized, however, that even though these four subdivisions provide under one head or another for the study of all phenomena entering into the physical environment, they do not furnish all that is needed in the correlation of inorganic environment and environed organism. As here presented, the critically important element of climate is not provided for. It is true that the explanation of the individual phenomena which enter into a climate is included under the head of meteorology, but meteorology, however necessary for an understanding of climates, does not and can not properly give any adequate idea of the different climates which are so important in their influence on life responses. Furthermore, the study of climates is not necessarily to be considered as a sub-head of meteorology, to be studied under that head, simply because it draws much of its data from that field. Climate has much to do with the planetary characteristics of the earth, aside from its relations to that field through meteorology. Climate is also concerned very intimately with certain aspects of land and water conditions. For these reasons, it seems that in any logical scheme of geography, the study of climates must be included as a sub-division of general physiography, along with the four already mentioned, and it must come after the study of those other divisions. Climatology, therefore, becomes the fifth and culminating department of physiography. In support of this arrangement it may be argued further that, in addition to conforming as nearly as possible to the logical order of sequence, it brings at the end of the physiographic list those particular phases of the inorganic environment—the surface of the lands plus climates,—to which organic forms show the most intimate, most numerous and most complex relationships.

Ontography and its divisions: Confusion. On the other side of geography, that is, ontography, the sub-divisions are more complex, they are comparatively less fully developed, and they lack uniformity and system. It is perhaps a natural outcome of the complexity of the subject that there should be temporary confusion on the organic

side and hence delay in evolving a systematic classification corresponding to what has been done for physiography. Yet it seems more likely that this absence of a logical grouping for the departments of ontography is the result of two other chief causes: first, the failure to establish a logical concept of geography as a whole, around which the entire science is to be built, and second, the general tendency to over-emphasize the different phases of the subject dealing with human life, without seeing their proper relation to the other co-ordinate aspects of the subject.

Under the concept that geography is the study of the relation of the earth to life, all forms of life responses must be provided for in the ontographic grouping. At the same time, moreover, any careful consideration of the relation of the earth to human life,—to which many are inclined to limit the subject,—will reveal immediately that such a restriction of the field not merely narrows the study, but renders even that part incapable of its full development. Life is so completely a unit that it is not possible to include some forms and ignore others if the human side is to be made intelligible. Thus, for specific example, man in the dry deserts of the world, is one of the plainest products of environment to be found, but he can not be considered intelligently in the true relation to his environment without a prior understanding of the relation of the desert conditions to the other forms of life which react on the human being.

The classification of ontography is further hampered by the tendency of many, especially those who come at geography from the outside, to split off a part of the real content of ontography, and use it, with outside material, for special consideration yet under the general name of geography. Few, if any of these, have undertaken, even in their own minds, the task of erecting ontography into a co-ordinated system, one part of which is related to the others, and each of which harmonizes with a scientific concept of geography as a whole.

Finally, much of the work which is now grouped more or less indiscriminately in the ontographic field has been done not by geographers, but by others,—historians, economists, biologists, and the like,—who have desired the geographical relations mainly as a background for their own special lines of endeavor. For that reason the nature of the work has been colored by the special subject from which the investigator came, and the scope of the various sub-divisions of ontography has often been indicated with reference to this outside emphasis, rather than having the work and the scope represent a product guided by a broad concept of the real field of geog-

raphy. The definition and grouping of the ontographic fields, in a co-ordinated system of scientific geography, therefore, though making use of existing terminology, frequently involves radical disagreement with many of the concepts which have been advanced from one side or another.

Terminology: Among the many terms already invented to cover special phases of ontography, the most used, the ones generally accepted, and worth considering, are phytogeography, zoögeography, anthropogeography, economic geography, commercial geography, historical geography and political geography. Such terms as "social," "moral," "business," "applied" geography and so on are not here considered as having sufficient individuality to warrant their inclusion as separate fields. Concerning some of the recognized aspects of the subject, especially the last four in the above list, there is much discussion as to the field covered, and their relations not only to geography but also to the subjects from which the qualifying adjective is borrowed.

The main logical divisions of Ontography: The grouping of these sub-divisions of ontography must be made in accordance, first, with the concept that geography is the study of the relation of the earth to life, and second, with the principle that life is a unit, in which the higher types are reacted on to a great extent by the types lower in the scale. Thus the relations of human life to its physical environment are both direct and indirect, the latter coming through man's relations to the lower forms of life which are indispensable to his existence. For this reason, the consideration of the human phases of ontography can not be made the primal consideration in the organized science. Since, moreover, what is true of man, as the highest animal, is to a greater or less degree true of most lower types of animal, the basal consideration must begin still lower down with the responses of plant life.

It appears at once, therefore, that there are three logical main divisions of ontography, according to the division of life into the natural groups, plants, animals, and man, the justification for the last division resting largely on our greater interest in the complex and multiple responses of our own genus. There are, then, as a basis from which to start, the three co-ordinate subdivisions of ontography: phytogeography, zoögeography, and anthropogeography, standing in their logical order of inter-relationship or dependence.

Phyto- and Zoögeography: As for the field covered by the first two divisions, there is a more or less common inclination to limit them to facts of distribution alone. This attitude is indicated by the

typical definitions quoted above, to the effect that "zoögeography describes the distribution of animals" and so on. Such an interpretation of phyto- and zoögeography can not be harmonized with the concept of geography as a whole, which is to crystallize the entire body of the subject into a systematic science. It is necessary to expand the idea to include also the habits and characteristics of plants in so far as they arise from the conditions of their environments. Thus the consideration of why desert species include few important seed producing types and why the most prolific seed producers are found in largest numbers in the warm and moist localities, are not only important responses of plant life to environment, but are also fundamental factors in the relation of human life to its surroundings. Phyto- and zoögeography, therefore, must be broadened beyond the simple concept of distribution of families, genera and species, in space; and both these fields must be developed along the broader lines before the full statement of anthropogeography is possible.

Anthropogeography. Its scope: Anthropogeography may be taken as the culminating, just as it is logically the last, main division of geography in the systematic grouping. The various concepts of anthropogeography differ widely in the breadth of view. A broad concept regards the subject as seeking "to devise an elucidative connection between the separate geographical frameworks and the history that has been erected and the civilization that has been worked out with them."* This definition apparently makes anthropogeography include all of ontography except the co-ordinate fields of phyto- and zoögeography. An intermediate definition states that "anthropogeography describes the effects of the environment in constituting the organic variations which have occurred in the course of human development,"† and cites as examples the shape of the head, pigmentation of the skin, texture of the hair, color of the eyes, stature, physique and the like—that is, relations all of which are morphological in character. Most narrow of all is the common idea that anthropogeography is the study of the "distribution of mankind," thus harmonizing it with the common concepts of the two other branches of ontography.

This last concept of anthropogeography, however, may be regarded as the result of first, the distribution concept of geography as a whole and second, the confusing of that term with *anthropography*,—without the *geo*,— or that branch of anthropology which

* Eckert, M. *Scot. Geog. Mag.*, Vol. XXIII, 1907, p. 562.
† Keasbey. *Pol. Sci. Quart.*, 1901, p. 483.

avowedly treats of the distribution of the races of mankind and their local variations. The relation of these different phases of life study may be shown graphically by the following method of grouping:

SCIENCE—BIOLOGY:	VARIATION AND DISTRIBUTION:	SCIENCE—GEOGRAPHY:
Study of the thing itself,		Study of Relationship,
Phytology (botany),	Phytography,	Phytogeography,
Zoölogy,	Zoögraphy,	Zoögeography,
Anthropology.	Anthropography.	Anthropogeography.

As indicated by this grouping, phytography zoögraphy and anthropography stand between biology on the one hand and geography on the other, but since they use geographical things, essentially locations alone, mainly in biological relations, they may be considered merely as the regional aspects of their respective subjects, and distinctly apart from the corresponding phases of geography where the idea of relationship is the dominant consideration.

The three primal phases of ontography, therefore, are not to be regarded merely as descriptions of distributions of life forms, but must be interpreted in the broader sense of including every sort of life response to the physical environment.

Its Divisions: If anthropogeography is defined as the study of the relation of man to his environment, it is necessary to group under that general head the various subdivisions of the human aspects of geography,— a number of which are already extensively developed and distinguished by separate names. Economic, commercial, historical, and political, geography, for example, thereby become merely specialized fields of investigation for the anthropogeographer. They are not any longer to be regarded as co-ordinate with that subject or with phyto- and zoögeography, both of which latter phases may themselves have subdivisions analogous to these subordinate aspects of anthropogeography.

It is around these subordinate phases of the human side of the subject, however, that most of the recent discussion has centered, from which most of the criticism of geography as a science has arisen, and with respect to which there is perhaps the greatest need for a systematic grouping in accord with the concept of geography as a logically organized study.

Economic and commercial geography: There is such wide diversity of opinion as to what is the field and the relationship of some of these special subjects, that it again is necessary to fix their limits with respect to subject matter before they afford any definite or common basis for grouping in the whole plan of geography. Most

of the uncertainty hinges about economic and commercial geography, which by some are regarded as essentially synonymous terms, and by others are held to be distinct and separate. In this case also it may be most instructive to begin with a concept formulated by one not a geographer, for, at the same time, it illustrates, perhaps better than any other, the way in which confusion has been introduced into the subject.

Economic Geography: The Economist's Concept: In answer to the self-asked question, what is economic geography? this writer first concludes that it is not commercial geography, and then goes on to say, "Our friends the geographers would doubtless answer, economic geography traces the influences exercised by the physical environment on economic activities . . . Economic geography does that and much more: it seeks to ascertain and explain the *geographical division of labor**—that is, the localization of industries, in terms not alone of the physical environment, but of all the factors involved, cultural as well as physical . . . nor is any fact excluded which bears on the geographical division of labor, *however remote it may be from the physical environment.*"*† This concept is worth following in its further elaboration as follows: "Economic geography will, therefore, consider first, under the head of *natural** controls, how relief, climate, soil, minerals, and other natural resources, influence the geographical division of labor. It will next consider, under the head of *human** controls, race, religion, languages, nationality, and government, in so far and only in so far as they affect the geographical division of labor. And finally it will consider, under the head of *economic** controls, to what extent transportation, the machinery of exchange, the supply, skill, and standard of living of labor, the supply, efficiency, and cost of capital goods, the organization of the factors of production, the methods of production, the principle of competitive and complementary industries, and other economical factors, determine the geographical division of labor."‡ Arguing from these premises the writer then draws the startling conclusion that "economic geography is *not a part of geography* . . . but an *integral part of economics*"* and treats his readers to the amusing deduction that "for the same reasons, it would appear that economic geography *can not be adequately handled except by a trained economist.*"§

So far as this concept is concerned, no one, least of all a trained

* Italics are mine.
† Robinson, E. V. *Pub.* Amer. Econ. Ass'n., Vol. X, No. 1, 1909, p. 5.
‡ Robinson. *Ibidem*, p. 6.
§ Robinson. *Ibidem*, p. 10

geographer, would dispute this last contention. A coherent science of geography, can by no logical process of reasoning be made to include such items as the consideration of the "machinery of exchange," the "efficiency of capital goods," or the "organization of the factors of production," "however remote from the physical environment." It is immediately obvious, from a glance at the things enumerated, that the concept is that of a trained economist, who is defining, not economic geography, with a concept of general geography in mind. but who is defining, regional economics, with a very clear concept of general economics in mind. Unfortunately, however, just so long as things may be written and taught, according to such concepts, and put out under the guise of geography, no matter what the qualifying adjective, just so long must geography be open to the criticism of encroaching on other subjects, lacking co-ordination and any unifying central theory.

Any phase of study bearing the nounal designation geography is to be defined in terms of geography, and not in the terms of the subject from which a qualifying adjective may be drawn. It may be worth noting, for example, that economic zoölogy and economic geology are accepted designations of special phases of their respective subjects and their definitions are made in terms of zoölogical and geological relations—not with respect to economics. The above concept, therefore, may be held simply as a sample of what economic geography is not.

Another typical definition which comes from the economic group is less objectionable, but fails to fit into the orderly plan of scientific geography. After an attempted separation of man from the lower animals on the basis of psychic differences this writer concludes that it is the "physical environment which determines the nature of the beast and the economic environment which occasions the character of man."* "Economics . . . may consequently be accepted as the fundamental criterion of civilization" . . . and "granting this, scientific geography requires the economic element to complete its classification and carry its descriptive study into the realm of human affairs." Going on with his analysis, this writer points out that the two important aspects of economics are the question of supply and of demand, the latter being the result of psychic phenomena and the former being controlled by physical phenomena. The definition of economic geography, therefore, becomes, "the *descriptive* study of the natural resources of the earth *in their application*,† through the

* Keasbey. *Pol. Sci. Quart.*, 1901, p. 87.
† Italics are mine.

processes of production, distribution and exchange to the satisfaction of human wants."* This concept, by placing the emphasis on *use,* and simple *description,* appears to be phrased with the idea that economic geography is to serve as an introductory study to economics, rather than to take its proper place in a system of geography as a perfect and exact science.

Both the foregoing definitions, which may stand as types of their group, suffer because the presence of the qualifying adjective, "economic," has led to the impression, among economists especially, that the definition of the subject must be made in the terms of the science of economics rather than in the terms of a science of geography.

Geographer's Concepts: "Distribution" Group. From these unsatisfactory concepts, placing the emphasis on the economic, rather than on the geographic, it is not a very long step to a concept held by many geographers, especially among those of the European group. In a recent discussion of economic geography before the Scottish Geographical Society, Chisholm advanced no specific definition of the scope of the subject, but implied his concept in his choice of illustrations. First, they were taken from the field of production, "that department of economic inquiry in which the relations between geography and economics are probably most numerous and closest,"† and in which the "simplest case . . . is the production of agricultural commodities for local consumption." Next the idea of transportation and trade was included, as indicated by the discussion of the wheat districts of Canada, Argentine and Siberia, with the remark that "in facilities for reaching over-sea markets, however, the three areas differ very greatly."‡ At the same time the importance of the effect of the "nature of the commodity" was considered, in the case of trade to foreign markets, while under the head of further considerations affecting the "transport and exchange of commodities"§ special emphasis was placed on the effect of the "carriage of bulky goods in cheapening the carriage of the less bulky." By way of illustration, a long analysis of British trade was brought forward. As a final element in the field of economic geography, the discussion of the factors influencing the "localization of industry," was taken up with reference to the character of the materials, the labor supply, local market and so on. A specific example of the items treated is found in the statement that the "proportion of the fuel cost in the

* Keasbey. *Ibidem*, p. 81.
† Chisholm. *Scot. Geog. Mag.*, XXIV, 1908, p. 114.
‡ *Ibidem*, p. 116.
§ *Ibidem*, p. 119.

cost of the finished article must be important in deciding the most important seat for industries."* Thus though no set definition is framed, economic geography, by implication, is concerned with the whole wide range of questions involved in the subjects of production, transportation and consumption.

It is immediately evident that such a concept of economic geography, can not be harmonized with the dominating principle of relationship between environment and life response, nor can such an economic geography be a part of any unified science of geography. Even if economic geography is to deal with some phases of production, transportation and consumption, it can not be held responsible for explaining all the facts of industry and commerce, any more than it can be held accountable for all the facts of history or other human activities. In the last quotation, for example, as to the effect of "fuel cost, etc.," the thing dealt with is clearly not in geographic relations, but stands simply as an item in the problems of industrial processes and costs. It is a case of dealing, not with economic geography, but with industrial economics. This error may be directly traced to the concept that geography must explain the distribution or place of everything, a concept which when applied, as appears here, can lead only to absurdity.

"Relationship" Group: A definition of economic geography which does fall in line with the scientific concept of geography, is found in the brief, but effective, statement, that "economic geography is the description and interpretation of lands in terms of their usefulness to humanity," and that its "net result is the understanding of the *relationship*† between the people of a district and their physical environment."‡ Such a definition not only recognizes the controlling idea of relationship in geography, but also immediately indicates where economic geography must be placed in the general grouping—namely, under the head of anthropogeography, as affording the basis on which human progress is to be interpreted. Furthermore, this definition alone makes possible a broad concept of economic geography, since it minimizes the narrow idea of actual use. The question of "the usefulness to humanity" is a thing quite apart from the mere consideration of application of material, etc. That this aspect was clearly recognized in framing the definition is indicated by the further significant statement that "in economic geography, resources become almost as important as products, because resources of to-day make industries of to-morrow" and in the "explanation and proper

* *Ibidem*, pp. 117–118. † Italics are mine.

‡ Smith, J. Russell, *Bull. Amer. Geo. Soc.*, 1907, p. 472.

estimate of resources lies the kernel of economic geography."* Production, and its resulting activities, must admittedly, so far as it shows relationship, be considered as a part of economic geography, but it is only a part.

Definition and place of Economic Geography: Economic geography may be regarded as concerning itself with those relations which hinder or favor human progress; such as the effect of climate on the requirements of food, the control of the distribution of food products, the relation of topography to the discovery and winning of useful minerals, the relation of surface configuration and climate to the use of the soil, and so on. The definition quoted above might then be recast to read, "economic geography is the study of the different types of environments in the relations they bear to the activities of human life." Under such a definition any particular region may be studied, as representative of a given type of environment and its value to human activities may be carefully estimated, entirely apart from any actual development, use, or application of resources by human inhabitants. This definition, furthermore, is radically opposed to the idea that economic geography is essentially the consideration of the geographical division of labor, or deals extensively with such fields as the medium of exchange and the localization of all industries.

Such a concept, as stated here, gives economic geography a definite basis on which to stand, a character in harmony with the concept of geography as a co-ordinated science, and importance enough to insure it a prominent place in the study of the subject. At the same time it lifts economic geography from a plane where it can be "treated only by a trained economist" to a plane second to none in the special fields of true geographical investigation. Economic geography, according to this concept, stands first, and most important, of the subdivisions under the head of anthropogeography, as furnishing an estimate of the varied physical foundations on which man has risen above the savage animal and based his upward course in civilization.

Commercial geography. Its faults: Commercial geography, which is often confused with economic geography, is perhaps the special field of the subject which at present is in the most chaotic state, with all manner of justified criticisms directed against it. Most of this criticism is based on the character of the text books of commercial geography, the majority of which were not written with any reference to a system of geography. For this reason they have tended to degenerate into a series of "convenient repositories of

* *Ibidem*, p. 111.

useful information," thus, in a measure, living up to their common ancestry in a German work which was designedly framed to set forth a mass of items "useful for the merchant to know." The line of reasoning from "merchant" to "commerce," and then to "commercial geography," to designate this body of non-descript items is obviously the result of the distribution concept of geography, which would include the place relation of anything or everything.

Commercial geography, as a part of scientific geography is concerned simply with the relations of the earth to the movement, circulation or exchange of utilities. It, therefore, depends intimately on economic geography, and may for many reasons be considered as merely a special phase of economic geography.

As a sample of the extent to which the subject gets away from this simple and logical concept the following items may be taken as typical. In a discussion of commercial geography printed some time ago, the trade of Glasgow was analyzed at considerable length. After stating that raw sugar imported from the Baltic ports is sent "by rail to the Greenock refineries," the discussion continues—"It is curious that the refined (and accordingly more valuable) sugar that comes from the continent to the same ports, when destined for Glasgow, is sent by canal, *the explanation being, no doubt,** that the canal barges are more convenient for delivery to the Glasgow warehouses than to the Greenock refineries."† Such an item may well be "curious," but it can not be regarded as belonging to commercial geography unless difference in the physical conditions of the two places is the real reason for this minor difference in the transport of the goods. Instances of this sort might be multiplied indefinitely, and with even greater inconsistency as for instance in the all-comprehensive estimation of the subject by a German geographer, who would include among the many things which the commercial geographer must know, such items as the water supply, the state of decomposition of the different kinds of rocks, the regional distribution of the different kinds of roads, and the average duration of journeys.‡

Definition of Commercial Geography: If commercial geography is to be held accountable for a description of all exchanges of goods, or for an analysis of every aspect of trade down to its most insignificant local or curious detail, that so-called commercial geography cannot be an orderly study, nor can it be an integral part of a science of geography. If, on the contrary, commercial geography is defined as, and limited to, the study of the relationship between physical

* Italics are mine.
† Chisholm, *Scot. Geog. Mag.*, 1908, p. 123.
‡ Eckert, *Scot. Geog. Mag.*, 1907, pp. 563–566.

conditions and the transportation and exchange of human utilities, it immediately becomes capable of orderly arrangement, it is an integral part of a science of geography, and its place in the logical grouping of the fields of that science is obviously next to economic geography. It may be considered either as a sub-head under that subject or with equal justice placed as a co-ordinate phase of the large field of anthropogeography, in deference to the importance of commerce to modern civilization.

According to the above definition the field of commercial geography is made distinct, and all items, however important from the commercial standpoint, but not entering into geographical relations, are excluded. Commercial geography seeks merely to study the commercial responses to conditions of the environment, and does not in any sense seek to describe or explain all existing or conceivable trade relations. Commerce and commercial geography are distinct and separate fields of study. Furthermore, commercial geography is not concerned with production beyond the fact that certain human utilities are brought into existence, and hence may enter into movements and exchanges which may be determined by conditions of the environment. Resources and productions are the *foundation,* but their consideration is not the *field,* of commercial geography.

Economic geography deals with the types of environment in which man may live; commercial geography deals with the relationships of special phases of human activity developed in certain of those types. The two plainly enough can be treated to advantage simultaneously, in so far as any particular type of environment is concerned, but the line of division between the two phases may equally well be drawn as sharply as between any other two phases of geography.

Historical and political geography: The remaining two existing fields of ontography, historical and political geography, are relatively much less extensively developed than are economic and commercial geography; in fact they have in many places been accorded barely any recognition. Historical geography, so far as it has been developed at all, has been done mainly by students interested primarily in history, and working without reference to any logical structure of geography in which their results were to be an integral part. Political geography has rarely been the subject of mature, systematic study, especially on this side of the Atlantic. The natural result of these conditions has been to leave the field of ontography in an unfinished and indefinite state, since, in certain respects, historical and political

geography are to be regarded as marking the culmination of the subject.

Criticism of historical geography: The objection has been raised that the designation, historical geography, is a misnomer, since "geography is not a historical study," and that this field might better be called "geographical history."* The former term, however, is in general use, and may be justified on the grounds that it is uniform in character with economic and commercial geography, and may be interpreted, as in the case of these latter, to imply simply relationships of a particular sort, here between environmental conditions and responses in the past. It is further criticised that the so-called historical geographies are "merely mechanical combinations of out-of-date editions of political geographies . . . bound together in one volume" and that "in order to systematize the study of historical geography a basic principle is necessary."† The first part of this contention finds its cause in the fact that historical geographies have been developed with reference to historical relations, which are avowedly chronological, and therefore unsystematic, and not with reference to geographical relations. The second part of the contention may be satisfied by introducing into the subject the basic principle of "the relation of the earth to life," which immediately sets the bounds of the subject and throws it into the orderly scheme of a geographical science.

Definition of historical geography: It is necessary to recognize, however, that the "historical" part of the term may be interpreted in different ways. It may be taken to mean the history of man in the progress of his civilization, or it may be taken to mean the political history of various human groups or nations. According to the adoption of the one meaning or the other, the subject has a different significance to geography as a whole. If the first interpretation is followed, it will result in a co-ordinated study of the relationships between man and his environments at different times in his progress, and thus furnish a connected, complete background for the interpretation of existing civilizations in their geographic relations. If the second interpretation is followed it will lead to the truly geographic explanation of many events in the past, such for example, as the strategic value, and defense, of the pass at Thermopylæ, of interest and help in the study of history, but of little or no significance to the present problem of the study of the relation of the earth to its inhabitants. From the standpoint of geography as a science, there-

* Davis. *Proc.* Amer. Phil. Soc., XLI, 1902, p. 241.
†,Keasbey. *Pol. Sci. Quart.*, 1901, p. 89.

fore, historical geography may more profitably be interpreted in the sense that it is the study of the relations of the earth to the development of human civilizations. Defined briefly, historical geography may be considered as the application of economic geography in the past.

The development of the subject along these lines would necessarily involve the most important responses in the history of groups or nations, and would similarly subordinate the great mass of interesting or curious items, having little or no bearing on the understanding of the earth in its present relations to life.

Political geography: Unsatisfactory condition. Political geography stands as the one phase of the subject, so much neglected in the mature study, that few even have ventured a definition of its particular field. This state of affairs accounts perhaps for the criticism that the text-books of political geography, "are for the most part made up of variegated maps exhibiting the territorial extent of states, population statistics set forth in tabulated form, and running commentaries on the topography of the various countries considered."*

Concept of Political Geography: Among the few definitions which have been framed, however, unanimity of concept is conspicuously lacking. A definition typical of one group says "political geography may be defined in general terms to be geography in relation to political and social institutions."† The use of the word social in this definition makes the exact sphere vague, for the reason that many social institutions might be mentioned, under the broad interpretation of the term, which are so far remote from political institutions as to preclude coherence in any study attempting to cover both. This difficulty is not removed by the further elaboration of the concept where it is said that, in teaching the subject, emphasis is laid on (1) explaining how each country studied came to be a separate, distinct country; (2) on its political institutions, and the geographic influences that have affected them, and (3) present political problems of paramount interest in each of the countries studied.

Such a concept cannot be accepted as it stands, since, for example, explaining how each country came to be separate, leads in most cases far into the realm of pure history; the study of political institutions, as such, belongs to the student of comparative governments; and political problems of paramount interest, may it is true,

* Keasbey. *Loc. cit.*, p. 89.
† Johnson, E. R. *Bull.* Amer. Geog. Soc., 1906, p. 107.

but do not necessarily, enter into geographical relations; where they do not, the entire consideration of them is the task of the political scientist, not that of the geographer. In these respects, therefore, the concept includes too much, and in doing so leaves the true field of geography. In other respects, that is, when regarded from the standpoint of evolving an orderly science of geography, which shall be both logical and complete, this concept is too narrow.

Definition of political geography: Political geography should be interpreted not as the study of the geographical relations of political institutions, and problems, but more nearly in accordance with the concept as stated by Keltie, to the effect that "Political geography is the application of the data included in these two great divisions of the subject (physiography and anthropogeography) to the affairs of those groups or communities of men, which in their more developed condition we designate states or nations."* A simple adaptation of this concept may define the field of political geography as the study of the relations between political communities, or nations, and their surroundings.

Such a concept makes political geography dependent on all the other phases of anthropogeography, since economic, commercial and historical geography are necessary precursors to the complete understanding of the relations between national states and their surroundings. This concept also makes political geography essentially synonymous with one phase of regional geography, the regional unit being the political division in which the group is situated. Finally such a concept accords to political geography, the important function of bringing together the separate threads of anthropogeographic study into a definite whole, in which the goal attained is the interpretation of *modern* civilizations in their relations to the earth.

Political geography is consequently the logical capstone of the entire subject, and instead of deserving neglect, it is perhaps the most fruitful field of investigation now open to the geographer. Its successful development, however, hinges on the development of systematic geography as a whole, according to a single scientific concept or central idea. The comparative geography of different regions can not be treated satisfactorily until some system of geography has been adopted under which all investigators may work along harmonious lines.

The ontographic grouping: According to the various spheres assigned to the different phases of ontography by the preceding definitions and discussion, the existing phases stand in definite re-

* International Geography, p. 109.

lationships to one another and may therefore be grouped in the following progressive sequence. By applying the same principles other phases which might be developed could readily be placed in their proper association in the grouping as it stands:

GEOGRAPHY:
- Organic side—Ontography.
  1. Phytogeography.
  2. Zoögeography.
  3. Anthropogeography.
     a. Economic geography.
     b. Commercial geography.
     c. Historical geography.
     d. Political geography.

Such a grouping according to a single dominating, unifying principle, which is kept prominent at every turn—such a grouping, and only some such, can make geography an orderly study and make possible its reduction to a systematic science, not only in one part, but in every part, not merely in the general considerations, but in the regional studies as well.

Systematic Ontography: It is true that the ontographic aspects of geography are to-day studied in large measure individually instead of generically, but it is not necessarily so, for the reason that wherever similar controls operate on similar forms of life there are similar relations of responses of organism to environment. Thus it is possible under the relationship concept to have systematic economic geography, just as readily as to have systematic physiography, since the classification of environments is as practicable as is the classification of land forms or climates separately.

As soon as a classification for economic geography is adopted, the general principles of the subject may be elaborated, following which the development of regional economic geography—all on a systematic basis,—may be done as readily as regional physiography is studied systematically to-day. With the classification for economic geography completed, it serves as the logical basis from which to develop the other, dependent, phases of the subject, according to similar systematic treatment, a condition especially to be desired in the case of political geography.

Conclusions: One of the most serious criticisms of geography, to the effect that "scientific geographers stop short before the phenomena of civilization and take no account whatever of the recorded facts of history,"* could no longer have any foundation in case of a

* Keasbey. *Pol. Sci. Quart.*, 1901, p. 82.

scientific geography developed according to such a grouping as here presented. In this grouping there is a logical place for all the "phenomena of civilization" and the "recorded facts of history," in so far as they enter into true geographical relations. More than that is not the province of any plan of a scientific geography.

The question may also be raised as to the real position of the physiographer under this concept of geography. The position seems far clearer and more important than under any other concept, for, while physiography may be studied and considered by itself, geography, as here interpreted cannot be taught or studied successfully without physiography—the environment to which the life responses are made. Investigations in physiography alone, therefore, as serving to make clearer important aspects of life environments, are direct contributions to the subject of geography. The physiographer then is a geographer in the broad sense, and specifically a physiographic or physical geographer, in the same way as there are engineers in general, with civil, mechanical or electrical engineers in particular. This interpretation of geography consequently takes nothing from the importance of physiography—quite on the contrary it elevates that part of the subject to the plane of furnishing the foundation without which the rest of the subject can not be erected.

Finally, it has been well said in criticising adversely the concept here adopted for geography as a whole, that the "function of any science must be stated in such a manner as to afford a criterion of when its task is accomplished."* Such a statement of the function of geography as a science is possible only through the adoption of this principle of relationship by which the entire field is unified. That this concept makes it possible to mark the accomplished task is indicated in the establishment of an orderly system as is here suggested: a system of defining and grouping which builds up steadily and logically from control to response, from foundation to superstructure. In physiography its subdivisions are arranged in sequential order, culminating in the most important aspects of the physical environment—physiography of the lands and climates. In ontography, its divisions fall naturally into such a grouping that all lead up to and culminate in the most important aspects of the human responses—that is, in the geographical relations of human civilizations. Geography thereby is given the necessary qualities of a coherent science, with a perfectly distinct field not covered by any other existing science, and no longer is open to the criticism of being merely "a heterogeneous agglomeration of dissociated items."

*Chisholm. *Scot. Geog. Mag.*, 1908, p. 568.

THE TERRITORY OF MAGELLAN

BY

MARRION WILCOX

Nearly one-fourth of the entire area of the Republic of Chile is embraced in the Territorio de Magallanes, which extends along the Pacific coast from lat. 47° S. to the southern extremity of South America. On the southeast it is, indeed, separated from the Atlantic Ocean by outlying portions of Argentina; nevertheless the most important eastern outlet is secured to it by Chilean control of both sides of the Straits of Magellan. It has thus practically an outlook upon both oceans. Moreover, in accounts of the early voyages to the New World as well as in the most recent reports of South American progress, this region figures prominently. An elaborate and authoritative statement in regard to its geography, history, industries, and population has long been desired; and such a statement has recently been published in Spanish at Punta Arenas.*

We learn that the surprising development that has taken place during the last decade in the Territory of Magallanes and the city of Punta Arenas, in population and building as well as in all branches of commerce and industry, in sheep and cattle raising and mining, prompted the city magistrates to enter into arrangements for the preparation of a general census of the Territory; and doubtless one of the motives influencing them is to be found in the fact that erroneous reports had gained credence, both at Punta Arenas and in South America generally, such as, for example, the report that a majority of the inhabitants of the Territory were foreigners.

In order to enhance the importance of the work and give it an official character the commission of Alcaldes requested the national government to lend its approval to the plans for taking this census, and the request was granted immediately. The governor of the Territory applied to the Central Office of Statistics for some instructions that would aid in bringing the projected work to a successful conclusion. That office replied by sending model forms, blanks, etc.,

*Censo Jeneral de Poblacion i Édification, Industria, Ganaderia i Mineria del Territorio de Magallanes, República de Chile, Levantado por Acuerdo de la Comision de Alcaldes el dia 8 de Setiembre de 1906. Pasado i Presente del Territorio de Magallanes. Por Lautaro Navarro Avaria, Médico de Ciudad, Director de la Oficina del Censo. Punta Arenas. First vol., 4to, lxvi and 382 pp., 1907; second vol., 4to, 563 pp., 1908. A map and many illustrations add to the value of the work.

which were to be used in the next general census of the republic. The national organizations which are entrusted with the duty of encouraging various industries also coöperated by furnishing details in regard to their method of gathering information. We may, then, speak of this census as the first to be taken in any part of the republic in conformity with formularies adopted for the census of the whole country, for which plans were being made at that time. But it is much more, as we shall see.

Dr. Lautaro Navarro Avaria, who was appointed director of the work, has given signal proof of ability and enthusiasm. Desiring that the Territory should be correctly described from all points of view, he did not confine the undertaking within the limits of the plan for the general census: rather, he added a second part in which we find full particulars regarding the local administrations, fiscal and municipal; meteorology, demography, nosography; commercial and maritime affairs; the progress of education and the philanthropic or social organizations. The director writes: "I think that the combination . . . makes a very exact picture, representing the grade of advancement attained by the Territory of Magallanes in its short life, which barely extends a bit beyond sixty years." He has not taken into account the nomadic, aboriginal population of the Chilean sections of Patagonia and Tierra del Fuego and the western canals of Patagonia and Beagle; but, on the other hand, this survey does include natives under the protection of Anglican and other missions. It appears that the Chilean people themselves require instructions in regard to this region which has been a terra incognita even to them ("tan desconocida hasta ahora"). The director of this census thinks that the degree of progress and culture to which this remote territory has attained will be a genuine revelation (verdadera revelacion) to citizens of Valparaiso and Santiago. The Territory has received a current of immigration much greater than that which has been available for the development of other portions of Chile; and a great majority of the immigrants have been men who came to take part in sheep-raising and the varied industries, or who were attracted by the discovery of gold.

The total area of the Territory is 171,438 square kilometers (66,861 square miles), the continental part comprising 86,972 and the islands 84,466 square kilometers, according to this authority. In order to bring out more clearly the meaning of these figures, the following areas are offered for comparison: Rumania has 130,000 square kilometres, Uruguay 178,700, Italy 296,000, and the Republic of Chile in all 756,990. The inhabitants number 13,309.

We find 80 per cent. of the population of the Territory concentrated in the city of Punta Arenas and the town (officially designated as a "city") of Porvenir; only one-fifth, or about twenty per cent. in those portions of the rural districts which are dedicated to stock-farming. The climatic conditions are unfavorable to agriculture in the wider sense of the term, but sheep thrive uncommonly well on the immense pastures. The number of shepherds employed decreases steadily as the holdings called estancias increase in size. Thus, to cite only one example, in the region of Ultima Esperanza before 1905, when there were many estancias owned by different people, the population was greater than it is at present, simply because all but two or three of the estancias have been acquired by a single company, the Sociedad Esplotadora de Tierra del Fuego. The rural population is very unevenly distributed, one-third of the total number living in a relatively small area north and south of Punta Arenas and between Cabo Negro and Agua Fresca.

A large majority of the houses are of wood, and a single story in height, the average number of occupants in each being 5.24. The increase in the population of the Territory since the year 1843, when the Chilean government "occupied" it by sending eleven colonists to Fort Búlnes, is traced as follows: The increase is most noticeable between 1885 and 1906. In 1889, Governor Samuel Valdivieso succeeded in attracting to Punta Arenas many families from the central and southern provinces of Chile, by granting to such new comers building sites within the city limits. About the same time the development of stock-farming and the discovery of gold drew immigrants from England, from Buenos Aires, and from Valparaiso. During Manuel Señoret's administration the government continued to offer substantial inducements to settlers. We note that 2,918 persons arrived between 1894 and 1899.

Of the total population, 62.13 per cent., or almost two-thirds, are males, although the equilibrium between the sexes is more nearly established in the Chilean element. Among the foreigners the difference is enormous, 72.41 per cent. being men and only 27.57 per cent. women. The assumption that the foreign element is numerically predominant proves to be wholly unfounded. The census shows that two-thirds of the inhabitants of the Territory are Chileans (exactly 64.06 per cent.) and only one-third, or 35.93 per cent., foreigners. The only part of the Territory in which the foreign element predominates is Tierra del Fuego. A surprising fact brought to light by Dr. Avaria's investigations is that Austro-Hungarians constitute 30.71 per cent. of all the foreigners. The English, form-

erly most numerous, now rank second. Then follow the Spanish, Italian, German, Argentine, and French groups. An analysis of the population with respect to religions shows representatives of the Roman and Greek churches; Protestants (nearly one-half of whom are Chileans); Jews and Mohammedans. The Christians predominate, and a great majority of them are Roman Catholics.

Exceedingly interesting are the statistics relating to instruction, for it is shown that 77.77 per cent. of all inhabitants of the Territory, above the age of six years, can read and write; 1.89 per cent. can read but cannot write; and only 20.33 per cent. are entirely unlettered. But the percentage of illiteracy in the Republic of Chile as a whole was given as 75 per cent. in the census of 1885 and 72 per cent. in the census of 1895! Comparing the Chilean population of Magellan Territory with the foreign element, the former shows 25.51 per cent. of illiteracy as against 13.23 per cent. for the latter. A still more favorable result is obtained if we scrutinize the reports of primary and secondary schools. It appears that more than 83 per cent. of all children of school age can read and write, while less than 17 per cent. must be classed provisionally among illiterates.

Only 14.35 per cent. of the inhabitants are land-owners. More than one-half of all real estate belongs to Chileans; 17.80 per cent. to Austro-Hungarians, and 4.55 per cent. to Spaniards. The city of Punta Arenas, with its suburbs, has 10,103 inhabitants. Porvenir is credited with only 519.

We are dealing here with a handful of people in a vast region, but we share the Director's opinion that he was fully justified in his efforts to enlarge the scope of the work assigned to him. He writes: "We decided to prepare a work which should be the first complete census ever made in Magallanes. As such it may serve as a basis of comparison for those which shall be subsequently undertaken. Moreover it was proper to make known the structure of the population of Magallanes in general, and of its two cities,—so different from that of the rest of the republic." Characteristic of the progressive spirit of this small and remote community is the circumstance that Punta Arenas was the first city of the Republic of Chile to establish a branch of "that altruistic and philanthropic institution, the Red Cross." We read that an organization founded in December, 1903, was officially recognized in 1905 as the "Instituto Central de Chile de la Cruz Roja Internacional."

Punta Arenas already has some of the features commonly associated in our minds with a much larger place: The civil and maritime government houses; the dockyards of the naval stations; hos-

pitals and a lazaretto; formidable prison and penitentiary, police headquarters, and court rooms; social clubs and municipal theatre; public library (sadly limited), English, German, and public schools; three daily newspapers and other periodicals. Its maritime traffic is very little inferior to that of Valparaiso, because its position on the Straits of Magellan makes it quite inevitably the port at which all trans-Atlantic steamers call, to renew provisions or effect repairs of their engines, or perhaps only to pass a few hours while awaiting a favorable moment for passing more or less dangerous points. In the course of a single year (1906) vessels entering the port numbered 969 (tonnage 1,193,556), including 68 warships, 795 merchantmen, and 106 sailing vessels; and vessels leaving the port numbered 979 (tonnage 1,197,347), including 71 warships, 800 merchantmen, and 108 sailing vessels; the grand totals for the year being 1948 vessels and 2,390,903 tons.

It is a pleasure to find in that part of the world a region for which the claim is not advanced that it excels all others in mineral wealth. The Territory of Magellan has no mineral resources that can be compared with those of the provinces of the north and center of the republic; such is the frank declaration made in the second volume. Exploitation of minerals, we are informed, is effective at only two points; and reference is made, first, to the veins of coal (more strictly speaking, lignite), not of the best quality, which for a number of years have been mined at the Loreto, near Punta Arenas, and, second, to the copper ores obtained at Cutter Cove on the peninsula of Brunswick. There remain to be mentioned, so far as our knowledge extends at the present time, only the washings of auriferous soils at some points in Tierra del Fuego and the Minas River; bitumen or asphaltum (of which there are indications, though no considerable deposit has been found); petroleum (doubtful); and calcareous and other salts. A very modest list; and we notice with satisfaction that the writer who contributed this chapter realizes the impossibility of obtaining exact information when mining enterprise is still in the initial period—the period of study and preparation.

Geographical and historical studies in the second volume are particularly interesting. Even such brief enumeration of topics as our limited space permits will convey some idea of the main divisions of the Territory. Thus, separate and distinct consideration appears to be required for the following: North Continental Section; Central Continental Section—Region of Ultima Esperanza; South Continental Section—Chilean Patagonia—Peninsula of Brunswick; Western Islands and Channels of Patagonia; Islands and Channels

north of the Strait of Magellan; Islands and channels south of the Strait of Magellan; Tierra del Fuego; Islands and Channels south and west of Tierra del Fuego. An acceptable offering of more or less new information is made in the pages devoted to lighthouses, ports, and roads; discovery of the straits and subsequent voyages; flora and fauna; and Chilean hydrographic explorations.

EFFECTIVE OCCUPATION OF UNDEVELOPED LANDS

BY

S. P. VERNER*

We shall here consider the application of the scientific method to the "benevolent assimilation" of the still unconquered wilderness of new lands. Here are found a most bewildering array of heterogeneous problems, full of the most complex factors. There are barbarous peoples to be reduced to order, presenting psychological phenomena of the most intricate sort, questions in jurisprudence, in ethics, in political and social science, in military strategy, in governmental policy, each element a world of study in itself alone. Then there are questions in sanitation and hygiene—great heat, or abnormal variations in temperature, noxious insects, venomous or ravenous wild beasts, the stolid inertia of unbroken forest or of sterile desert, or of the rocky rampart of some impeding mountain chain. There are difficulties of navigation, seas and rivers to be charted, marked, and made safe, marshy plains to avoid, and many other questions, including that of profit and loss.

Men have blundered blindly in their contact with these problems, and so we have the sad story of early America, the awful history of most of Africa, the loss of great capital, the blasting of many fair hopes, the vanishing into thin air of many splendid schemes for the extension of civilization. But these things need no longer be. There is a method, capable of clear definition and of precise execution, which may be applied to promote the efficient

* Mr. Verner, well known as economic pioneer and explorer in the Belgian Congo, kindly permits us to print these extracts from a paper not yet published. His long, practical experience gives much value to this suggestive paper.

conduct of the work of developing the still unassimilated regions of the world.

The cause of most of the initial misery in Africa, as well as in Central and most of South America, was that the early settlements were death-traps. The reason is not far to seek. The east and west coasts of Africa are bordered by a littoral, low, marshy, mosquito-breeding, with high temperature and great humidity, untempered by altitude, and wide enough to offer a considerable journey to those seeking the interior, sufficient for a long time, before the development of means of rapid transit, to confine settlement to the coasts. Eastern South America, which was the first to be explored, offered similar conditions. Hence the settlements were all more or less alike in their semblance to the part of West Africa, of which the doggerel ran:

> "Beware, beware, of the Bight of Benin,
> For one that comes out, there's ten that went in."

It is wise to discriminate clearly between the two distinct classes of general enterprise before us. These are colonization by the whites, and civilization for the blacks. Perhaps it may not at first appear that these two are mutually dependent, but they really are, and they react and interact in a way which makes the success of the one a prime factor in the progress of the other. The colonization of the whites, and the civilization of the blacks, may go on *pari passu,* in a relation of reciprocal helpfulness. It is to be observed that what will make real settlement and permanent occupation by the whites both comfortable and remunerative will also add to the happiness of the blacks, for it is just where the white man is most unhappy, least able to work, most dependent on black servants, and forced to a life of make-shifts, that the blacks suffer most. The scheme to be outlined is one which will do as much for the aboriginal inhabitants as for the incomers.

The ten main features of the method advocated are these:

First: Seek to find a port on the Coast which is nearest to any elevated region or mountain, if possible having an altitude of 9,000 feet or more under the equator, or less to the North or South by 300 feet per degree of latitude. Are there any such places? They will be found in the hinterland of Sierra Leone and Liberia, at about 100 miles from the Coast; at Cameroons, at ten miles from the sea; at Sona Ngongo on the Congo R.R., at 200 miles inland; at Bihe in Angola, at 300 miles; in Mashonaland at 400 miles; at Kilimanjaro in German Africa at 250 miles; and in the Abyssinian highlands at a much nearer distance. In South American countries

such places are too numerous to mention on the West Coast, and they are happily not infrequent on the East.

The most specific effort must be made to aim at reaching any one of these highlands as early as possible; settlement on the coasts or below the safety-line should be entirely restricted to the barest requirements for reaching those uplands; farther progress inland should wait for the completion of a well-rounded colonial establishment on a suitable place in this desirable region; and the speediest possible means of transit should be inaugurated to it. In other words, this region should be the base, and it should be as well developed as Gibraltar, a sort of industrial fortress to command further operations. Let us call this base the High Colony.

Until the High Colony can be reached, a preliminary base must be established on the coast at the port. This unfortunate geographical necessity should be treated with great care in the selection of the locus. It is right here that many errors have been committed. A river's mouth is very tempting for such a base, and generally a worse place could hardly be found. At the mouths of every one of the African and South American rivers there has grown up a pesthole. It will be found that, generally, there is a sort of high peninsula abutting on or projecting sometimes far out to sea where a watershed runs down to the ocean between two rivers. This is notably the case with Cameroons mountain, which marks the ocean terminus of the watershed between the Calabar and Sennaga rivers. There are plenty of other such watershed termini all along the tropical coasts, mostly neglected as possible bases, because mariners have aimed at the estuaries, while really these promontories often form ramparts for the best harbors. The promontories are also, usually, the nearest natural seaports for the highlands from which they extend. There is one splendid example of the application of this principle, where the French government has built a city at Dakar, below the mouth of the Senegal, and practically on exactly such an ideal watershed-terminus as that described. Dakar is the finest, healthiest and most successful port in West Africa, and is a shining example of the application of this idea.

Second: Build a preliminary rapid transit line from the port to the High Colony. Here a prime difficulty arises. How are the evils of the coast region to be avoided while this line is being projected into the interior? The reply, of course, is that the evils cannot be entirely eliminated. But, in the conditions of modern constructive methods they may be greatly minimized, and since this one line is to do duty for a vast area, to remove wholly and forever nearly all the

evils previously endured, it is evidently a case where some suffering is justified for the great end to be achieved. Then too, this method concentrates all the necessary preliminary troubles into the building of this one line, whereas the previous haphazard settlement of the whole coast and the inconsiderate pushing inward all along the littoral has vastly increased the area of unhappy existence.

Then, too, if one chooses for a port the watershed terminus above described, he has only the valleys or marshy banks of the short streams which may occur at such places to deal with, so that in ten or fifteen miles he may reach a territory entirely free from mosquitoes and the water-loving insects (among which is the worst of African pests, the tsetse). White men may walk this distance, put their tentative camp there, install as a first work a pumping arrangement to get their water up above the mosquito-limit, go down daily to any necessary work on the beach, and return to spend the night at their high camp, by means of a preliminary road and traction vehicles. These two means of beginning work—pump and automobile —ought to be the first things considered in the new method.

This port ought to be developed for the one main purpose of being a base for this rapid transit line, and that alone, until it becomes, by sanitary engineering, entirely free from objectionable features. These sanitary measures are now so well known, thanks to Dr. Gorgas and the lessons in Havana and Panama, that they need not be described here.

Third: Concentrate in the first High Colony all the requisites for the further effective occupation of the remoter interior. This is of far-reaching and fundamental importance. What are these requisites?

The first one, and that of preponderating importance, is fresh food, sufficient in quantity and variety as well as in quality, for all the needs of the colony. It is here that the most woful mistakes have been made. Immigrants into Liberia have almost starved to death in one of the richest agricultural regions in the world. This I saw with my own eyes. In the early days of the Congo the sufferings of the whites from canned goods, and of the native laborers because of the early exhaustion of the surrounding regions during the building of the railroad and the inadequacy of the imported supplies, as well as the high cost of the latter, were a feature of the history of that country which it is to be hoped no nation will ever allow again. Indeed, the same thing is even now going on wherever concentration of labor is greater than local food-supply. This almost stopped the Benguela railway, and has been the *bête-noire* of all new

enterprises. While the first rapid transit line is being built, a field of a size proportioned to the number of men to be employed, and of the prospective number of coming colonists, ought to be cleared off, utilizing for the purpose all the most modern labor-saving machinery.

This work should be done with machine saws, stump-pullers, chain-drags operated by steam, steam-plows, large disc turn-plows, cultivators, etc. In fact, there is nothing which America has invented to facilitate farm clearing and cultivation which ought not to be used on such a place from the start. The mule did wonders for the plantation darkey, and the traction engine will do more for his African cousin. He must keep the fires going or the machine will not go. Put him at feeding logs to a saw, and he becomes an industrious laborer in a few weeks, where, as a wood-chopper, he may be a shirker for years.

Let us be specific as to this question of food. Suppose provision must be made for ten thousand laborers. This cannot be gotten in the region round about, for the native agriculturists raise barely enough for their daily breakfast, and their little hoes and axes are inadequate for more. To import enough would cost, on the Central West African Coast, in two years, at least $1,000,000. Now, a tithe of this expense would supply machinery, and completely clear off and cultivate a field large enough to feed all these men, besides leaving the field as a permanent asset to the colony. Three thousand acres of land planted in corn, peas, bananas, and garden truck, would be enough, while the forage would raise cattle, goats, and fowls in abundance. A fishery should be carried on at the port. In fact, if this method be taken at its full significance, it can be made the means of so ministering to the success of the enterprise as to make the difference between success and failure. Moreover, this planting must be done early, in anticipation of developments. No one need ever hesitate over possible loss in this matter. Such a food-center would attract natives for hundreds of miles around. Once gaining their good-will and making them look to the newcomers for a steady and abundant food-supply, and their labor can be used for the more remunerative business, such as rubber, mining, coffee and cacao growing and whatever local conditions may indicate. How much more desirable a system this is than that by which the early pioneers alienated and largely destroyed the American aborigines, and caused the infamies of the slave-trade days in West and East Africa! I know this, for I have tried the system, and it was so successful that it almost threatened to ruin neighboring enterprises by drawing all their labor away.

The second requisite is sanitary engineering. Before a town cumbers the ground, let every village be laid off with reference to the disposal of sewage, the purity of water-supply, the elimination of pests, the securing, if possible, of natural drainage, the clearing of all insect-harboring bush and grass, the retention of proper but not superfluous shade, the avoiding of bad winds and fogs, the provision of wide streets, the separation of different classes of population and of business and residence, the building of quarantine and hospital facilities, and the regular inspection both of premises and of the persons of the population. The latter may be an innovation, but it is a justifiable one. Let us build, if anything, better in new lands than at home. It would be a good thing if every person in such a colony were periodically examined by a physician, as well as his premises, to the end that disease be minimized.

Another requisite is the right kind of house for the local conditions. It is now known that the heat of the tropics does little damage if there be adequate protection between the head and the sun. If necessary, the houses may be specially protected against noxious insects.

A large retail magazine ought to be provided with every class of goods likely to be needed by the white settlers or the natives. The sale of intoxicants should be strictly limited and subject to regulations promotive of temperance and sobriety. The Belgians in the Congo issue permits for a limited quantity of spirits weekly, and no one is allowed to buy more. This may look like sumptuary legislation, but the principle worked out well in practice. A thoroughly organized medical service is a necessity, with a complete system of hospitals, quarantine stations, dispensaries, and free clinics for the indigent natives.

Provision for the recreation of the colonists ought to be made. Here there is often a lamentable lack of proper attention. Europeans are so wedded to the musical café, that they feel lost if they have no such place to which to resort after work, and the lack of it often drives them to excessive drink or other degradation. It is a common mistake to imagine that out-door exercise is unwise in the tropics. The most efficient official I ever knew in Africa, one who has held his post for twenty years in a very trying position, has probably played 10,000 tennis games in that time. Of course such recreations as shooting and fishing, botanizing and zoölogical collecting, photography, and the like are always open and ought to be highly encouraged.

Schools for the youth, and at least a sort of club or gymnasium

for all, ought to be included in the scheme, with plenty of books and an abundance of current literature.

The religious side of the life ought to be left to private initiative, but missions should be allowed to establish themselves, and to have full opportunity to do their work, although they should not be allowed to trade or to engage in industry in competition with other business.

Fourth: The safety-limit between the High Colony and the lower country having been found, let those who may be obliged to work below that limit go down to their work and return to the uplands daily. This necessitates an extremely efficient transport service. Indeed an ideal morning and evening train might well be run at high speed, for this purpose, and at low rates. This may be costly, but it is not so expensive as failure. There is really no need of any considerable establishments in the lower regions at all. A proper railway organization ought to receive cargo and carry it away as fast as unloaded, requiring only a large wharf-shed, and the minimum office arrangements, with a restaurant and toilet rooms. The country about the port ought to be cleared and drained, for the sake of the ships and the day-workmen, but if I had the power of *ukase* on the subject, I would not allow a single trading establishment, residence, store, factory or anything of the kind below the safety-line.

The natives, too, should not be allowed to stay in these regions at night. It is a common fallacy to think that the natives are immune to malaria, and to other of the ills incident to such localities. They are not only subject to all of them, but they are often decimated by them, and they convey these diseases to the whites. When one reflects that with the fast train and the telephone, as well as the automobile, one may fully work up a region of a diameter of over 100 miles from its highest and healthiest center, with all the residences and miscellaneous business establishments about this center, it is seen that not many such centers are required to effect the complete assimilation of an immense area. A hundred such centers, for example, would dominate the whole Congo basin, and eliminate most of the ills under which such a region suffers, under the old régime. In fact, by this plan, there need be no malaria, sleeping-sickness, dysentery, and other such diseases.

Fifth: The next principle is the extension of the rapid-transit lines into the surrounding territory from the first High Colony as a base, in directions indicated by natural resources. Any trunk-line, however, in general, ought to follow the watershed between large rivers, or at least be built above the safety-line.

Sixth: Automobile or traction-roads ought to supplement the main arteries of railway or trolley lines. This watershed or upland railway idea offers admirable facilities for the electrification of the lines almost from the start.

Seventh: A proper oversight of forest-clearing ought to be maintained, so as to conserve rainfall and to prevent wasteful erosion. No clearings ought to be allowed at all except under permits specifically providing for this feature. In grass-lands along sloping-river valleys, the native growth ought to be retained in places calculated to effect this purpose, and trees ought to be planted under governmental bonus to aid the end desired.

Eighth: In utilizing the river-systems, the base of operations ought also to be the nearest High Colony. Having effected the establishment of this colony from the sea as above described, when it is desired to use an adjacent river for transportation, a spur-line can be built down to the river, the clearing and sanitary work may be done by coming and going daily, and the river-base made thoroughly safe before beginning operations from it.

Ninth: These river-stations can then be increased in number by the same method of going to and fro from the first base until the second is properly fitted for work. Steamers need then stop at night only at these properly arranged river-ports, and need no longer be what they have so long been—travelling pest-houses. It is to be said also that the watershed railway will make it generally possible to reach the river in an hour's ride by rail, so that the two may mutually assist each other.

Tenth: As a rule, it is desirable to develop a riverine country from the headwaters downward. This may seem paradoxical, and contrary to nature, but it is true. The Amazon Valley is to be conquered from the Andes side. The East Coast Railways in Central Africa will ultimately effect the fullest development of the Congo and the Nile, by using the fact that it is easier to ship down-stream than up, and if the short distance from the sea to the heads of most rivers in the yet undeveloped parts of the world be first crossed by rail, the rest is easy.

There ought always to be reserved in any governmental scheme a distinct place for the individual colonist, on lands reserved for the purpose and administered with absolute impartiality. The French Congo has an admirable arrangement of this kind, by which the writer was able to buy twenty acres, where he could not get one in the Belgian Congo. It was indeed easier for the writer to get 400,000 square miles as a concession for his American associates than one

acre for himself in fee. Needless to say, the French side of the Congo is more popular than the Belgian, though it is not intended to criticize the many excellencies of the Belgian system in other respects.

It is the duty of the government to inaugurate such a plan as that outlined above for the benefit of the individual colonist. It is the duty of the government primarily to select the sea-port, to build the transit line, and to inaugurate the High Colony. When this is done, and the colonist is thoroughly inoculated with the spirit of the method in question, the rest of the development is comparatively easy.

As to the fact of the great capital expense involved in this plan at the outset, as compared with the prevalent method of creeping up pestilential rivers, and making such temporary gains as are possible from point to point, it is to be said that the latter system costs more than the former in a few years. Let me cite a case.

The greatest of the Congo concessionaire companies is the Compagnie du Kasai. Its objective has been to get rubber from the rich uplands of the Kwango-Kasai country, in the south-western part of the Congo basin. In brief, by the system of creeping up the rivers, this company is now earning $2,000,000 net, per annum. Its steamer service has cost in all about $1,500,000. The loss from men who have died or been invalided home represents at least $1,000,000 during its history. The annual expense of sending men home at short intervals, as a result of their living on the river-sides, represents the capital, at five per cent., when totalled over the ten years of the life of the company, of $10,000,000. Here is a total expense of over $12,000,000.

Now let us take this $12,000,000 and apply it under the scheme outlined above. On the West Coast of Africa there is a good harbor—as West African harbors go—at Kinsembo, where the watershed of the Loge-Mbrie rivers runs down to the Atlantic. Back of Kinsembo is Bembe, on an upland about 3,000 feet high. A line from Kinsembo to Bembe would be in the direct line for the upper Kwango-Kasai. Such a line would traverse one of the richest rubber regions in Africa nearly all the way. From Kinsembo to Bembe is about 150 miles. Fifty miles further is the Kwango-Congo watershed, running northward for 500 miles. To get to the High Colony on this watershed from the coast, a railway would cost about $5,000,000. Another $5,000,000 would get to the Kwango-Kwilu watershed, and cross the Kwango, affording transport on that river downstream for the heavy imported goods, and also downstream to the Congo and the Congo railway for exports of products beyond the reach of the Kinsembo line.

That is to say, with the money lost in the present system, the plan for the effective occupation of the upper Kwango-Kasai on the lines of health and comfort could be readily carried out. Besides this, there would be permanent colonies possible in these uplands, lands could be sold at a good profit, agricultural products raised and shipped, and the whole region brought under the definite régime of genuine colonial enterprise.

A noteworthy illustration of the method here advocated is afforded in the case of the French possessions in the upper Niger. As the English held the lower river, the French were obliged to get into their upper Niger territory by just such a plan as herein outlined, from the West Coast at Dakar. While all of the principles laid down above were not fully embraced in the French scheme, still the French Nigerian colony bids fair to be a standing object lesson in colonial development as a result of the government having been forced to adopt this method more or less completely. One now goes from Paris to Timbuktu all the way by steam, and in greater comfort and speed than would ever have been possible by ascending the Niger.

NOTES ON THE DESCRIPTION OF LAND FORMS.—II.*

LE RELIEF DU LIMOUSIN. By A. Demangeon. (*Ann. de Géogr.*, xix, 1910, 120-149.) There are some geographical articles which leave their readers with a confused sense of being lost in a maze of vaguely conceived hills and valleys, mountains and plains, where item follows item without plan or correlation. There are other articles from which the reader derives a clear picture of definitely conceived forms, grouped in an easily comprehended arrangement. The essay here cited on the Relief of the Limousin, a district in the northwestern part of the central plateau of France, by the professor of geography in the University of Lille, is an exceptionally fine example of an article that gives its readers a clear picture of the landscape that it describes.

The Limousin district, consisting for the most part of disordered crystalline rocks, overlapped on the north and west by gently inclined stratified formations, is over much of its area an uplifted peneplain, standing at altitudes increasing southeastward from 300 to 500 meters; but it is surmounted by scattered or grouped remnants of a still higher peneplain (800-900 meters) of earlier origin, and it is imperfectly dissected by young or mature valleys of later origin. Three cycles of erosion are thus recognized: Traces of the first are still preserved in

* No. I appeared in the *Bulletin* for September, pp. 671–675.

the solitudes of the broadly rolling highlands, chiefly on the most resistant rocks, whence the rivers Cher, Creuze, Vienne and Dordogne radiate. The work of the second cycle has over the greater area destroyed the highlands of the first cycle, in producing the wide-spread peneplain of the uplands, the even surface of which traverses various rock structures indifferently; but the peneplain is often surmounted by unconsumed cones, domes and ridges; and where the higher reliefs are grouped in the still preserved highlands of the first cycle, the work of the second is seen only in broad valley heads that appear as open embayments in the highland border. The work of the third cycle begins where the streams of which the headwaters flow in broad and shallow valleys on the peneplain, or in the valley-head embayments, and entrench themselves in narrow, young gorges, which rapidly deepen beneath the upland valley floors, and become well graded and maturely open valleys of the third cycle on reaching the stratified rocks, if not sooner. Thus it appears that the general land surface in the first cycle reached old age even on the hardest rocks; that in the second cycle it reached old age over large areas on crystalline and stratified rocks alike, but that it reached only late maturity at certain points where highland residuals remain; and that the third cycle is still generally young, although the valleys far down stream have reached maturity, and some of the weaker stratified formations are already maturely dissected.

Whenever the description of a district can be reduced to a definite scheme of this sort, any local part of the district, such as a hill, an upland, a slope or a valley, can be quickly apprehended, as well for itself as in its relation to neighboring parts. The reader's imagination is thus easily lead to follow the writer's understanding of the observed facts. When an outline map and a series of excellent photographs are appended, as in this account of the Limousin, there is little left for the reader to desire, except to see for himself the district, with whose interesting features he already feels familiar.

The author of this article follows the inductive method of presentation. He opens his exposition by citing examples of empirically described forms, located with reference to small villages and streams, the names of which, probably unfamiliar even to many French readers, may be found on the large-scale maps to which reference is made in foot notes. For example: "If one advances from Bellac on the Vincou toward the village of Blond on the south, the valley of the Vincou is crossed at an altitude of 180 m.; then on ascending the left slope of this valley, one reaches at about 285 m. a plateau which continues for several kilometers at about 290 or 300 m.; the plateau is a platform of crystalline schists faintly undulating with gentle depressions, covered with fields and woods. At last, suddenly, in the neighborhood of Blond, massive highlands rise in rounded forms to altitudes exceeding 500 m." In association with several similar accounts, a little later one reads: "We have, here as well as there, the same two topographical elements; first massive highlands, and next a platform on which

the highlands rest. In this platform the present valleys are excavated." After three pages of these empirical details, a page is given to a general account of the highlands, and three pages to the platforms or plateaus; and only on the ninth and tenth pages of the article, after the reader has inevitably discovered for himself that he has to do with a district of three cycles of erosion, is the explanatory scheme of the three cycles explicitly set forth.

Is it not worth considering whether the explanatory scheme should not be placed, for the convenience of the reader, on the first page of an article of this kind? The scheme offers no particular difficulty to the understanding; it is not a venturesome proposition which needs a gradual introduction in order to persuade the reader to accept it; it is simply a new example of an explanatory or genetic conception of land forms that must now be familiar to every modern physiographer. True, in the course of his investigation, the observer must accumulate his items of fact, one by one, as his field studies advance; only after such a beginning can he reach an inductive generalization. He may perhaps at the outset not at once understand what he sees, and in such a case his earlier notes must necessarily be in empirical terms. It may be only near the end of his records that a well conceived and concisely phrased scheme embracing all his results is elaborated; though in a district where the relation of forms is so manifest as would seem to be the case in the one here treated, a growing suspicion as to its evolution might have been written down along with the notes of the walk described in the introductory paragraph, quoted above; and a strong persuasion or even a conviction of the truth of the suspicion might have been noted with the records of the second or third experience of this kind. But when it comes to presenting the results of the investigation, is not the convenience of the reader greatly served by reversing this order, and concisely announcing the conclusion at the outset; so that, as the reader afterwards comes upon the separate items of fact, he may at once place each one where it belongs, instead of having to carry it in uncertain position in his memory until the conclusion, unnecessarily delayed, is at last disclosed? Experiment in this direction is worth making.

Schleswig-Holstein. By K. Olbricht. (*Geogr. Zeitschr.*, xv, 1909, 315-332.) If there are still some geographers who are uncertain as to the relative value of the explanatory as compared with the empirical method of describing land forms, here is a second article which should lead them far towards a decision in favor of the former and more rational method. Its readers learn that the peninsula which includes Jutland (the mainland part of Denmark) on the north and Schleswig-Holstein on the south, is made up of a series of subparallel elements, arranged in meridional belts, the axial member being a young terminal moraine. On the east the moraine is adjoined by a rolling drift surface of uneven hills and hollows, often holding lakes in the south and repeatedly traversed by shallow west-east troughs. On the other side of the moraine is

a west-sloping moorland of outwashed sand, spread forward on a gently undulating surface of older drift, through which some isolated masses of still older drift rise here and there, especially in the south; and on the west border of which the waves and the winds, sweeping in from the whole breadth of the North sea, have submaturely retrograded the originally irregular shore line and thrown up a belt of dunes next inland from the gently sloping beach. The west-east channels east of the moraine are explained as valleys, normally eroded in layers of gravel and till, and enlarged by the last advance of the ice, which furthermore scoured and roughened the neighboring partly dissected drift surface of an earlier advance, sometimes producing drumlins; it was this advance of the ice that formed at its western border the terminal moraine which now constitutes the axis of the peninsula. Some of the streams of the western slope rise a little east of the moraine and make their way through it in notches.

The northern part of the peninsula, or Jutland, still retains a good part of its original breadth, although the enclosed bays between the truncated headlands of its west coast, as well as the islands on the east coast, suggest some diminution by moderate submergence before or during the development of the present shoreline. The southern part, or Schleswig-Holstein, has been reduced to half the breadth of Jutland by greater submergence. Thus a good part of its former eastern extension has been cut off in scattered islands, its present eastern shoreline has become extremely irregular, and the channels in the eastern belt of rolling drift are now occupied by slender arms of the sea, or Föhrden, which reach nearly or quite to the axial moraine; while on the west the outer part of the older undulating drift surface is drowned, and the dunes that formerly rose on it in a presumably continuous line, such as still exists along the west coast of Jutland, are broken and worn back in discontinuous islands, which very imperfectly enclose an area of high-tide marsh and low-tide mud flats. With the exception of the vigorous attack of the sea on the west coast, post-glacial erosive processes have had little effect; nearly all the surface still remains about as it was left when the last ice sheet vanished.

The meaning of the contrasts in breadth and outline of the southern and northern parts of the peninsula is thus made clear and easily remembered. Each element of existing form is presented as the product of sufficiently defined general processes; and the relation of the several meridional belts to each other, both in their original breadth and in their present unequally diminished breadth, is easily understood. On a rational basis of this kind, local details and place names are easily added. For example, the broken dune-islands of Schleswig are known as Fanö (this one belonging politically in Jutland), Römö, Sylt, Amerum, and so on, and constitute as a group the North Frisian islands: the southeasternmost member of the series is still attached to the mainland by a strip of marsh. Tondem, Husum, Itzehoe and other towns on the west, south

as far as Hamburg, lie on tidal streams where the dry moorland meets the wet marshes; Hamburg gains importance over its less known neighbors, because of being situated on the Elbe, whose valley brings it into relation with much of North Germany. Hadersleben, Apenrade, Flensburg, Schleswig, Kiel and Lübeck are all at or near Föhrden-heads, east of the axial moraine.

The author announces his intention at the outset of giving a general view of geographical relations. In view of this object, he makes what the present reviewer is disposed to regard as a mistake in introducing a variety of geological details, for which no particular geographical application is found—a mistake for which much countenance may be found in many geographical essays of recent years, especially in Germany. A number of statements are of purely geological import, such as the thickness, deformation and erosion of the underlying Cretaceous and Tertiary formations; and these statements are moreover frankly recognized as largely hypothetical, because they are based more on the results of scattered borings than on surface observations, outcrops being very scanty. Similarly, certain accounts of the earlier glacial deposits are chiefly geological rather than geographical, because they are largely concerned with the order of past occurrences, as indicated by the succession of buried drift sheets; and because, with the small exception of the isolated hills of older drift mentioned above, these past occurrences do not bear directly on the features of the present landscape.

The reason for the introduction of irrelevant geological matters in a geographical essay of this kind is perhaps to be found in the extraordinary abundance, value, and detail of geological studies in Germany, and indeed in Europe generally. A geographer has almost to go out of his way to avoid being entangled in them, for they abound in geographical as well as in geological journals. In geology, all such details are of course essential; but if they do not bear helpfully on an appreciation of the visible landscape, or on the conditions and activities of its occupants, they are distracting interruptions in an avowedly geographical essay, where their space can better be given to matter of a more strictly geographical nature.

A notable novelty in Albricht's article is the use of the words *vergraden* and *Vergradung,* apparently corresponding to the English words, grade and grading: a welcome novelty indeed, for hitherto, the German equivalent of a graded river has been *ein ausgeglichener Fluss;* now it might be *ein vergradener Fluss.* If *vergraden* is accepted, it would seem as if *aufgraden, abgraden, vorgraden zurückgraden,* and *wiedergraden* might also be used as equivalents of the useful terms, aggrade, degrade, prograde, retrograde and regrade, particularly as it is difficult to form these compound verbs, if the already compounded verb *ausgleichen,* as the translation of the English verb, to grade, is taken as their root.

W. M. Davis.

GEOGRAPHICAL RECORD

AMERICA

PROTECTION OF THE GRAND CANYON OF THE COLORADO. This canyon in Arizona is now acknowledged to be one of the most astonishing sights of the world, and the greatest example of direct erosion to be found. The region including this enormous gorge constitutes what has been termed the "Geologist's Paradise," for the book of the earth's crust here opens to him its varied pages in a most extraordinary way. Bare edges of strata of thousands of feet are exposed for hundreds of miles; giant faults show themselves in numerous places; and all manner of geologic marvels are revealed. Of no less interest is it to the geographer, the botanist, the artist, the tourist, to everyone.

Realizing this, action from time to time has been taken by the government to protect and preserve the canyon for all the people. But probably through a misunderstanding of its magnitude up to the present, only a portion has been protected. This fact led the American Scenic and Historic Preservation Society recently to name a committee, consisting of Dr. George F. Kunz, President of the Society, Mr. W. B. Howland, Dr. Edward Hagaman Hall, and Mr. F. S. Dellenbaugh, who was one of Major Powell's companions in the exploration of the country, to take up the matter and to urge the extension of the reservation. By appointment, this committee called on President Taft on November 3 to lay before him the facts in the case.

The committee asked the President to withdraw enough of the public domain to include the whole of the chasm, from the head of Marble division to the Grand Wash, the end of the Grand Canyon division. He expressed himself as being entirely in sympathy with the project, saying also that the region ought to be a national park, that the creation of such a park is mainly now a question of method, and that he would bring it to the attention of Congress at an early date.

The lands to be withdrawn being extremely arid and rocky, with no settlements, and lying wholly within the Territory of Arizona, the question is not a difficult one. The magnitude of the canyon thus to be preserved is such that the Yosemite, the Yellowstone Canyon, Niagara Falls, Mt. Washington, and several other scenic treasures, all at one time could be scattered along its length and lost within it, for including the Marble Canyon division the continuous chasm, as the river runs, is 283 miles long, with a depth for many miles of from 5,000 to 6,000 feet and a width at the top of from less than one, to twelve or fifteen miles. The average depth is about 4,000 feet. The fall of the Colorado river in this distance is more than 2,300 feet, over a series of powerful rapids. Every tributary enters the main gorge through one of its own, hardly less majestic, and the proposed National Park would include a large part of some of these great side canyons.

THE HUDSON BAY RAILROAD. It is understood that the actual construction of the Hudson Bay railroad will begin next spring. *Canada* says that the contract for the construction of a bridge over the Saskatchewan River at the Pas Mission, about 52° 40′ N. Lat., has been awarded. The railroad has now reached this point and at the north end of the bridge, the building of the western

end of the Hudson Bay R.R. will begin. It is about 90 miles west of the north end of Lake Winnipeg and nearly as far north. The railroad will extend from the Pas Mission to Port Nelson or Port Churchill, from 400 to 500 miles.

ALASKAN EARTHQUAKES OF 1899. In 1905 Tarr and Martin investigated the striking evidence of changes in the coast line of Yakutat Bay during the earthquakes of September, 1899. During the preparation of their full report upon this evidence, the junior author, Prof. Martin, sought information concerning the area affected by the earthquake and its associated phenomena in regions beyond the area of field work. In a recent article (*Bull.* Geological Society of America, vol. 21, 1910, pp. 339-406), Prof. Martin has presented an outline of the results of this investigation. He finds that the greatest of the earthquakes, that of Sept. 10, was felt by observers in all places within a radius of 250 miles of Yakutat Bay, and at isolated points even at a distance of 480 miles. About 216,300 square miles of land were affected by shocks sensible to casual observers; and if it may be assumed that an equal area of the Pacific to the west of Yakutat Bay was also affected, the minimum area of disturbance was 432,500 square miles. A possible maximum shaken area of 1,539,000 square miles would be deduced if the radius were extended out to the regions where isolated observers have reported the shock. The earthquake, therefore, ranks high among the notable earthquake shocks of North America. For example, the California earthquake of 1909 was felt throughout an area of only 372,700 square miles. No life was lost, however, in this unsettled region, and no notable damage was done to buildings. Besides the interesting and important discussions of details concerning this earthquake and a study of seismographic records from stations all over the earth, Prof. Martin gives a list of the known earthquake shocks of Alaska as far as he has been able to obtain it. This list will be of importance in future studies of Alaskan earthquake phenomenon, and the article itself is a distinct contribution to the subject. R. S. T.

THE PAN-AMERICAN R.R. The British Minister at Buenos Aires reports (*Bd. of Trade Journ.*, Oct. 20, 1910) that the Pan-American Conference there resolved that the construction of the Pan-American R.R. should be left in the hands of the Pan-American R.R. Committee at Washington, which is advised to prepare a definite plan so that the line may be completed at the earliest possible date. The total length of the line from New York to Buenos Aires will, it is estimated, be 10,116 miles. The northern part of the line is now in operation from New York, through the City of Mexico to the northern frontier of Guatemala, 3,869 miles. The completed links in the line farther south, reduce the mileage still to be constructed to 3,700.

AFRICA

LIBERIA CONNECTED WITH THE GERMAN CABLE SYSTEM. On March 21, the extension of the Emden-Teneriffe cable was landed at Monrovia, the capital of Liberia. This is Germany's first cable connection with Africa. It is expected that the cable will be extended farther south to the German colonies of Togo and Cameroons.

PROGRESS IN SOUTHERN RHODESIA. A paper in *United Empire* (vol. I, No. 10, Oct., 1910) informs us that the Liebig Company is buying a ranch of 400,000 acres, to be stocked within five years, with cattle from which Liebig products

will be prepared. This seems to show that experts have concluded that stock-raising is now a safe enterprise in Rhodesia, although the pastoral industry has been retarded by the various cattle diseases which afflicted South Africa for years. The agricultural possibilities also are large and much is expected from tobacco and maize. It is not a country for the man without means, as a certain amount of capital is essential for successful farming. Rhodesia is now contributing a good deal of gold, the product amounting to $13,750,000 in 1909. The ore is of a quality that yields the best result from economical and individual working. Of the 145,000 square miles of Southern Rhodesia, three-fourths has an elevation of 3,000 feet and one-fourth, 4,000 feet above sea-level, so that the excellent climate makes the land a white man's country.

Pygmies in the Southern Part of the Kasai Basin. Mr. E. Torday, the Hungarian explorer, gave, on March 7, before the Royal Geographical Society, an account of the admirable work he has done in ethnology in the Kasai Basin (*Geogr. Journ.*, vol. 36, No. 1, 1910). He found that each chief in a large region south of the Sankuru River had under his suzerainty a small group of pygmies who hunt for him while he provides them with vegetable food in exchange for their game. One group, abandoning the nomadic life, has constructed a small village and taken to agriculture. This is, perhaps, the first instance of the kind on record. Mr. Torday makes this rather startling statement:

"Only two generations have passed since they left the forest, and they have already lost their pygmy appearance. Though not as big as the Bushongo, they have attained a stature far superior to that of the average pygmy. As intermarriage between Bushongo and these 'half ghosts' (which they are considered to be) is out of the question, it must be admitted that sunshine, air and regular life have been the main factors in this change." He also points out, what seems to be a parallel phenomenon, that, as a rule, the forest people are somewhat short in stature, but those who live in the open, cultivated clearings in the forest increase in stature.

The Lower Congo R.R. Mr. H. G. Mackie, British Consul at Boma, reports that an electrical engineer has arrived there in connection with the proposed electrification of the railroad between Matadi and Leopoldville (140 miles) by utilizing the hydraulic power of the Congo cataracts which the railroad circumvents. The traffic on this line is steadily increasing, the most notable feature being the transport of large quantities of material for the upper Congo railroads, now under construction, as well as for the projected line in French Equatorial Africa (formerly The French Congo). All vessels arriving at Boma are heavily laden and several extra steamers are now in the service.

Second African Expedition of Prince Adolf Friedrich of Mecklenburg. This expedition started for Africa from Hamburg on July 9. Its purpose (*Geogr. Zeitsch.*, vol. 16, No. 9, 1910), is to explore the boundary regions between the Cameroons and French Equatorial Africa (formerly the French Congo), and especially the very large and partly unknown areas of the numerous tributaries that join the Congo on its right bank. A visit to Lake Chad is also planned. Lieut. von Wiese, under the Prince, will lead the expedition, and the scientific members are Prof. Dr. Haberer, Dr. Schulze, Dr. Schubotz and Dr. Mildbrand. Mr. Heims is the artist. Scientific societies of Hamburg and Frankfurt contributed over $100,000 towards the expenses. The party is expected to be away about fifteen months.

ASIA

KOREA ANNEXED BY JAPAN. A treaty was signed between Japan and Korea on Aug. 22 by which Japan acquires sovereign rights over the peninsula, which ceases to exist as a state and becomes a part of the Japanese Empire under the name of Chosen. Japan abolishes the consular courts but continues without change for ten years, all the commercial rights that foreigners have enjoyed.

DISCOVERIES IN NORTH WEST MONGOLIA. A short report which Mr. Douglas Carruthers has sent to the *Geographical Journal* (Oct., 1910) seems to show that he has already accomplished some excellent work in this part of the Chinese Empire. His expedition started, early this year, for the extreme upper basin of the Yenesei. Leaving Minusinsk on the upper Yenesei in May, he traversed the Saiansk and Beikem districts and discovered that the supposed main range of the Saiansk Mts., which appears on the maps as the boundary, in that region, between Siberia and Mongolia, does not exist. Its place is taken by isolated groups of very rough, rugged mountains, apparently a series of disconnected uplifts which occurred in different directions and at different periods. This Mongolian region has a strong affinity with Siberia, not Mongolia. The climate, scenery, people, flora and fauna are all Siberian. Almost imperceptible water-partings divide the river systems, and many glacial lakes not shown on the maps were discovered. Dense forest covers most of the surface and the dry Mongolian flora begins to appear only in the valley bottoms and southern slopes of the hills around Cha-kul. In the heart of the forest are nomads living in birch-bark wigwams and depending for subsistence on their domesticated reindeer. This animal was also found wild, proving that the reindeer is indigenous in this part of the Chinese Empire. As the maps are very inaccurate, the party made a careful survey of the whole route through the upper Yenesei region, some 1,800 square miles being mapped.

POLAR

NORWEGIAN EXPLORATIONS IN SPITZBERGEN. The *London Times* of Oct. 7 contained an account of the recent explorations in this archipelago by Capt. Gunnar Isachsen's expedition which returned to Christiania on Sept. 18. The land work was done chiefly in the northwestern part of the main island, and the most striking result was the discovery of a not long extinct volcano and hot springs in Bock Bay, a branch of Wood Bay. The details seem to prove that the volcanic cone is at least of Quaternary age and later than the general glaciation of the region. The cone, about 1,650 feet high, is described as consisting partly of lapilli. It is in the neighborhood of a north-south fault that brings Devonian sandstones into juxtaposition with granite. The ice conditions were unusually difficult. Bell Sound, in the south-west of the island, was blocked with ice before the end of August and hunting sloops are now there frozen up.

CLIMATOLOGY

HAS THE CLIMATE OF INDIA CHANGED? Meteorologists the world over seem to have caught the fever of an interest in climatic oscillations, or changes. This is, doubtless, the natural result of the numerous recent publications coming from geographers and travelers in different regions, in which reference is made to the evidence, or supposed evidence, of climatic fluctuations. Dr. Gilbert T. Walker, Director-General of Indian Observatories, has lately become a con-

tributor to this widespread discussion. In Vol. XXI, Part I, *Indian Meteorological Memoirs* (Calcutta, 1910), Dr. Walker publishes a report on "The Meteorological Evidence for Supposed Changes of Climate in India." It is to be noted that this concerns the *meteorological* evidence, *i. e.,* evidence based upon the records obtained by means of meteorological instruments, and does not deal with physiographic or with traditional evidence. There is much confusion on the part of many writers in their understanding, and in their use of the various kinds of evidence, just as there is confusion as to the relative value of this evidence.

The weakness of the monsoon in northwestern India since 1894 has given rise to conjectures that the climate of that region had altered permanently, and this (supposed) alteration has been explained, at various times, as being due to an increase of irrigation, or to a decrease in forest cover. The Indian Government requested that a report be prepared upon this question, and this was done in January, 1908. The general interest in the matter led to the publication of this report, with the additional evidence given by the data for 1908.

The observations used were carefully selected for their accuracy, and the results are plotted in a series of curves. It appears that there is no proof of any permanent climatic change, but there has been a tendency over a large part of northwestern and central India for the rainfall during the past thirty years to increase to a maximum between 1892 and 1894; to sink to a minimum in 1899, and to improve slowly since that time. The recent deficiency of monsoon rainfall must be attributed to something abnormal in the larger movements of the atmosphere, and not to human agency. The deficiency has not lasted long enough to justify the conclusion that there has been a permanent change of climate. And there are marked indications of a return to good seasons.

R. DEC. W.

A NEW CLASSIFICATION OF CLIMATES. Many suggestions as to a classification of climates have been made in recent years. It is beginning to be difficult to keep the various different schemes in mind. Those who wish to gain a general idea of the classifications proposed up to the year 1906 may refer to "The Classification of Climates, II," (*Bull.* Amer. Geog. Soc., Aug., 1906, pp. 465-477), where maps are also given. Within the past year two new schemes have been suggested, one by de Martonne in "Traité de Géographie physique" who, following about the same lines as Köppen, proposes thirty climates; and the other, a still more recent one, by Penck, "Versuch einer Klimaklassifikation auf physio-geographischer Grundlage" (*Sitzungsber.* k. preuss. Akad. Wiss., phys-math. Cl., 1910, XII, Mar. 3, pp. 236-246). Penck calls attention to the fact that several of the more recent classifications involve an exact knowledge of the individual climatic elements, necessitating long series of meteorological observations. In other words, as most of those who have tried to employ these classifications will agree, they are too complex for general use. For this reason Penck finds in the general conditions of precipitation and in the relations of the land surface to precipitation a simpler and a more rational basis for climatic subdivision so far as the land areas of the world are concerned.

There are three main climatic provinces: I. *humid,* in which there is more precipitation than can be removed by evaporation so that there is an excess in the form of rivers; II. *snow* ("nivales Klima"), in which snow falls in excess of the processes of removal, so that there is transportation by glaciers; III. *arid,* where evaporation eliminates all the precipitation, and could dispose of

still more. Here, therefore, water flowing in from outside can be evaporated. These three principal divisions are separated by two important limits. One of these is the *snow-line;* the other is designated as the *dry-line* ("Trockengrenze"), *i. e.,* the boundary between the humid and arid climates. The "Trockengrenze" is obviously a broader or narrower band, rather than a line.

In the humid climate there are two subdivisions, that with frozen soil and that with ground water. The latter is further subdivided according to the distribution of rainfall, whether this is uniform throughout the year, or irregular. When there is a regular alternation of arid and humid conditions we have the *semi-humid* province (with tropical, subtropical and monsoon districts). Where the distribution of rainfall is uniform we have the *full-humid* ("Voll-humide") province (with equatorial and temperate subdivisions). Similarly, the arid group of climates is subdivided into two provinces, (1) in which aridity prevails throughout the year, or (2) only in certain seasons (fully arid, semi-arid). The *snow* province has a subdivision where snow alone falls ("Vollnivale Provinz") and where rain occasionally falls ("Semi-nivale Provinz").

Professor Penck's scheme commends itself because of its rational basis, and by reason of its simplicity. It will doubtless meet the wishes of many geographers who have been loath to adopt schemes of climatic classification whose meteorological or climatological basis was very complex. R. DEC. W.

BRITISH RAINFALL ORGANIZATION. The British Rainfall Organization, initiated by the late George J. Symons in 1860, and after his death, in 1900, carried on by Dr. H. R. Mill, has, this year, been vested in a body of trustees. This step ensures the continuance of this most important organization for the future. Unique among meteorological organizations, this rainfall service has for years done a work for meteorology and climatology whose value it is impossible to overestimate. Mr. Symons devoted himself heart and soul to the establishment and development of this, his pet and peculiar hobby. Dr. Mill, for the last ten years, has earned the gratitude of his fellow workers in science the world over for undertaking the difficult and responsible task of carrying on the organization. Dr. Mill deserves the further gratitude of meteorologists for ensuring the permanence of the undertaking, and may well be congratulated on the successful establishment of this splendid service on a sure foundation. R. DEC. W.

PHYSICAL GEOGRAPHY

ORIGIN OF CORAL REEFS. In a very suggestive article (*Amer. Journ. of Sci.*, vol. 30, 1910, pp. 297-308), Professor R. A. Daly undertakes to show a possible connection between the development of coral reefs and the presence of glaciation in the northern and southern hemispheres. He shows that atolls and other coral reefs rest on a shallow plateau with an average depth of about 45 fathoms. A possible explanation of this plateau is marine erosion, but a difficulty in the way of this hypothesis is the defence which the reefs themselves offer against the attack of the waves and currents. If, however, the climate were cooler, reef building corals could not flourish in many parts of the ocean where they are now living. Professor Daly suggests that such a condition may have existed during the glacial period, and that during this time, which may have had a duration of from 300,000 years to 1,000,000 years, many of the lower islands of the open ocean were planed off, while the higher islands were notched, in both cases giving platforms on which coral growth could take place.

To account for planation at a depth as great as 45 fathoms, Daly assumes

a lowering of the sea level through the withdrawal of water for incorporation in the great ice caps of the two hemispheres. Assuming an average thickness of ice of 3,000 feet, there would be a lowering of the ocean's surface of about 125 feet, and by the gravitative attraction of the ice there would be a lowering of the level of the equatorial sea about 30 feet more. Taking the area of ice cover as 6,000,000 square miles, and the average thickness of the ice as 3,600 feet, the shift of level of the equatorial sea would be about 30 fathoms. This coincides quite well with the depth of the coral reef platforms and of the lagoons and channels in atolls. It also explains the presence of submerged valleys on the islands that rise above fringing reefs, whose depth never seems to exceed 45 fathoms. These valleys are assumed to be the work of land streams, submerged as the sea level rose with return of water during the disappearance of the ice caps.

Students of coral reefs have brought forth many facts which make it difficult to accept the current theories, either the Darwin-Dana theory, or the Murray theory. This suggested explanation of Daly seems to meet the objections that have hitherto been raised to current theories, and its elaboration will be watched with interest. R. S. T.

Natural Bridges. It has been a common custom to consider natural bridges as mainly solution phenomena and as associated in the main with phenomena of caverns. It is, therefore, of distinct interest to read the thorough discussion of the subject of the origin of natural bridges presented in an article by Prof. Cleland (*Bull. Geolog. Soc. of Amer.*, vol. 21, 1910, pp. 313-338). This article considers the subject under several headings based upon differences in origin, and in each case it is shown first, how a natural bridge can originate in that manner, and then individual instances are discussed, and many of the cases are illustrated by half-tones. From the analysis of origin and individual instances, Prof. Cleland concludes that natural bridges occur in both glaciated and unglaciated regions, that they are necessarily short-lived structures, and that they are formed in materials of various kinds, including limestone, sandstone, marble, gypsum, conglomerate, marl, clay, shale, schist, and lava. They may be developed in any stage of erosion from youth to early old age, and it is unsafe to make a statement as to the origin of a natural bridge without a careful field study. He recognizes five well-marked divisions on the basis of origin, some of them with several subdivisions. These subdivisions are as follows: (a) By deposition, for instance by the deposit of travertine, or of snow or avalanches across stream courses; (b) by gravity, as when a stone is wedged in a narrow chasm; (c) by wave action differentially eroding along sea or lake coasts; (d) by solution in which seepage, the caving in of superficial tunnels, and the combined action of subaërial and subterranean erosion are the main elements; and (e) by stream erosion. The better known natural bridges of the United States are due to processes operating under one of the two last divisions, the Virginia Natural Bridge, for instance, being the result of solution by seepage, certain Florida and New York bridges resulting from the partial caving in of superficial tunnels, and an extensive series of natural bridges being the product of stream erosion in one form or another. Among the latter causes one of the most interesting is the perforation of the neck of an incised meander, during which the stream, eating out its bank from both sides, actually undercuts the narrow neck until a natural bridge is formed. Such seems to be the case with at least some of the remarkable natural bridges recently discovered in southeastern Utah.

R. S. T.

GENERAL

HONORS. The Royal Scottish Geographical Society will award its medal to Prof. James Geikie for his numerous contributions to geographical research and his great services to the society; and the Livingstone gold medal to Sir John Murray for his oceanographical work and to commemorate the completion of the bathymetrical survey of the Scottish freshwater lochs.

CONSUMPTION OF NITRATE. A Reuter despatch from Santiago, Chile, says that the world's consumption of nitrate, during the past year, amounted to 43,996,996 quintals (about 2,200,000 tons), an increase of about 8,000,000 quintals as compared with the previous twelve months.

GEOGRAPHY AND GEOLOGY AT THE BUENOS AIRES CONGRESS. This Congress was one of the features of the celebration of the centenary of the Revolution of May 25, 1810, and was held in Buenos Aires on July 11-25 last, under the auspices of the Argentine Scientific Society. According to the summary in *Nature* (Oct. 20, 1910), the principal papers in the Geography and Geological section related to Argentina, Chile and adjoining countries. Engineer Luis Riso Patron, Director of Land Surveys in Chile, read a paper on the development of geographical and geodetic work in that country, Prof. Codazzi one on mining in Colombia, Señor Maurtúa spoke on geographical work in Peru, Engineer Machado on petroleum in Chile, Engineer Hermitte and Lieut.-Col. Romero on petroleum in Argentina, and the topography and mineralogy of the Andes were treated in various papers.

The Argentine Meteorological Office presented many interesting papers, chiefly on the meteorology of Argentina and the southern ocean. Its director, Dr. Davis, spoke on the temperature of Argentina as compared with other countries. Prof. Clayton described a new method of forecasting which promises to cover longer periods than is now possible. Profs. Mossman and Solyom spoke, respectively, on the effect of the antarctic currents upon the weather of South America, and the cyclones and anti-cyclones of the South American continent. Dr. Knoche described the organization of the meteorological service of Chile, and Dr. Montessus de Ballore read a paper on a convention of the seismological services of Chile and Argentina. Dr. Negri treated of two seismical laws discovered by himself.

ISLANDS WHOSE EXISTENCE IS DOUBTFUL. At the meeting of the British Association in September, at Sheffield, Capt. J. K. Davis described the research voyage undertaken by him in the *Nimrod* (May-July, 1909), under instructions from Lieut. Shackleton to try to locate certain islands in the South Pacific shown on the charts. The results of the voyage show that the Royal Company islands, the Nimrod islands and Dougherty island are not in the neighborhood of the positions assigned to them and it is probable that they may safely be taken off the charts. The places where they have been shown on the charts are: Dougherty I., 59° S.—120° 15′ W.; Nimrod Is., 56° S.—159° W.; Royal Co. Is., 50° S.—140° E.

GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

BOOK REVIEWS AND NOTICES

AMERICA

Agricultural Argentina. Statistics for the year 1909–1910. Prepared by the Bureau of Agricultural Statistics and Rural Economy for the Ministry of Agriculture of the Argentine Republic. 165 pp., index, synopsis, and map. Printing office of the Argentine Meteorological Department, Buenos Aires, 1910.

Comparing the Argentine agricultural system with that of Canada, we may call the latter intensive and must call the former extensive. Thus, in Canada the farms of less than 200 acres constitute 88 per cent. of the total of holdings of rural property; in Argentina the holdings are relatively large, and it appears that farms which best respond to the present conditions of agriculture there are those of 500 to 750 acres. The capital required for farming operations in Canada is $59.25 gold per hectare (2.47 acres), including the value of the land, buildings, and machinery; in Argentina, $27.70 gold per hectare. The increase in land farmed in Canada between 1871 and 1891 was 75 per cent.; the increase in the area devoted exclusively to the cultivation of cereals in Argentina between 1895 and 1909 was 284 per cent. The value of agricultural and pastoral products exported in 1905 was: Canadian exports, $93,331,608 gold; Argentine, $311,278,220 gold.

Such figures as the foregoing arrest attention, especially because the inhabitants of the two countries compared are about equal in number, though the area of Argentina is only one-third as great as that of Canada. Señor Lahitte, chief of the bureau which prepared 'Agricultural Argentina," says that the comparison was deemed necessary in order to explain the *raison d'être* of the Argentine extensive agricultural system, "founded on this principle of rural economy: to obtain the maximum of profit with a minimum of capital and labor." The republic has at present, according to this latest official statement, 19,000,000 hectares of cultivated land. The increase is shown as follows: From 1810 to 1888, only 2,380,000 hectares; from 1888 to 1910, nearly 17,000,000 hectares. Exported products of stock-farming were valued at only $3,300,000 in 1822 and at $71,075,955 in 1888, but in 1909 their value was $153,548,356. The value (in gold) of agricultural and pastoral exports combined was $392,000,000 in 1909.

M. W.

En Amérique latine. 2e Édition. By Henri Turot. Preface by Pierre Baudin. viii and 359 pp., 144 illustrations and 2 maps. Vuibert et Nony, Paris. No date.

M. Henri Turot has written several books beside the present work. He is warmly commended by his fellow-countrymen, for the display of exceptional activity as a traveler and of talent as a writer; but to us, unfortunately, it

seems only too plain that such undeniable gifts were placed on the altar of special interests when he visited Brazil and Argentina. Those are countries that need to make friends everywhere, and have a fairly clear title to the friendship of every great nation. There is opportunity for all in the future development of Brazil and Argentina. We must, however, try to accept without cynical comment the conclusion that we have here, in this attractive volume: special pleading in favor of the extension of French influence (in opposition to the entirely legitimate American interests) throughout southeastern South America. M. Pierre Baudin says in the preface that the great merit of "En Amérique latine" is that Henri Turot depicts a land admirably prepared to receive the French, to follow the lead of France, to love Frenchmen and lavish treasures on them.

"The mission of M. Root and the Pan-American Congress at Rio are two great 'acts' which it would be wrong for us to regard without personal interest. As Henri Turot says very justly (and he was there as an attentive spectator), they were productive of temporary impressions rather than of permanent results. Feeble, separated by violent discord, distressed by revolutions, the southern republics formerly offered themselves as easy prey to the political designs of the north. The latter . . . had not sufficient knowledge to see all the chances that offered themselves to her at that time. To-day she is evidently impressed by the awakening of these countries endowed with incomparable natural resources . . . But her *clairvoyance* appears to be tardy and too selfish. She is suspected. The republics commence to feel their own power and they know their good fortune. Their tendency is rather to follow such affinities as appeal to them through community of race and of civilization than the inaffective and inferior territorial relationship. Without repulsing the overtures of their great neighbors, they yield more willingly to their inborn predilection for their great Latin sister. They come to France. They invite the French to visit them. They prefer the French language. They crave the instruction of our teachers, the advice of our statesmen. They adopt our fashions, our literature, our drama. They only ask that they may share the overflow of the enormous accumulations of wealth in France . . ."

In the chapter entitled "États-Unis et Brésil" the author says: "Did the United States have the idea of forming a league between North America and South America, for the purpose of boycotting European products? That is possible. But in any event they quickly perceived the assured failure of such an attempt, and they gave it up. In fine, if M. Root desired for political reasons a sort of American confederation stretching from the mouth of the Hudson to the Straits of Magellan, he easily acquired the conviction, in the course of his voyage, that such a project cannot possibly be realized. Was it this *déconvenue* which inspired the attitude of the United States at the last Hague conference? I do not know. But at any rate it is well to mention that, when wishing to establish categories among the states there represented, the North American delegates, by proposing to put Argentina and Brazil in the rank of powers of the fourth or fifth class, cruelly wounded the pride of those whom they were anxious to captivate the year before. Great was the anger felt throughout Brazil on reading the debates in regard to the tribunals of arbitration . . . On the other hand, the prestige of France was enhanced in the eyes of the Brazilians who saw M. Leon Bourgeois seconding with all his ability—for the reason that they were just—the opinions of M. de Rio Branco, so eloquently brought forward at the Hague by the Brazilian senator, Ruy Barbosa."

The Mississippi River and Its Wonderful Valley. By Julius Chambers. 308 pages, maps and 80 illustrations. G. P. Putnam's Sons, New York, 1910. $3.50.

So great is the interest in the possibilities of the Mississippi as a highway of commerce, so hopeful are the people that our facilities for transportation are not to be wasted and so eager is the desire for a sane solution of the problem of waterways, that this last book on the Mississippi will be, at first, somewhat of a disappointment, for it hardly rises to the present interest in the river. Less than a dozen pages on the present evolution of a great river system hardly warrants so inclusive a title as is given to this book. On the other hand, commercial possibilities and conservation of power may sometimes cause us to lose sight of the romance of earlier days. Many steps in the history of the river are narrated here and new light is given on some chapters of the story.

Back in the "era of fable" the account begins and the rumors and first indications of the river, as shown by European explorers, form the first chapter, a "conjectual period," of the history. Then follow accounts of the explorations of De Soto, Cartier, Allouez, La Salle, Joliet, Marquette, Hennepin, St. Cosme, Iberville and La Seuer. The discovery of the headwaters has considerable attention, and an account of a voyage in 1872 down the entire length of the river is interesting as a picture of the Mississippi, previous to any attempt to control it. The choice of material, however, is not always happy, as *e. g.*, when 50 per cent. of the account of the journey from St. Louis to New Orleans is filled with a second-hand gambling story. "The Mississippi in War" is the heading of a long chapter which treats of the struggles with the Indians, the defeat of the British at New Orleans in 1815 and the battles of the Civil War, especially those about Forts Henry and Donelson, Shiloh, New Orleans and Vicksburg. Many other affairs of the river are briefly mentioned, as the Louisiana Purchase, Lewis and Clark, Itasca State Park, the Delta and the "Mississippi Bubble." The volume closes with an historical account of the large cities along the river. The pictures are clear and well chosen; many of them are recent views and present what the text has somewhat neglected, the present aspect of the river.

R. M. B.

AFRICA

Die Pflanzenbarren der Afrikanischen Flüsse. (Münchener geographische Studien, No. 24). Von Dr. Oswald Deuerling. iii and 253 pp., 14 photo-engravings, 2 maps, bibliography and index. Theodor Ackermann, Munich, 1909. M. 5.

This is a very careful study of the blockading of river channels by vegetation, and especially in the Nile basin, where the sudd has frequently formed an impenetrable barrier to navigation until artificially removed. Due attention is given to these impediments in the rivers of the several continents, but the sudd of the Nile is most thoroughly discussed as to its manner of formation, the varieties of vegetation that enter into its composition, its distribution and the methods of removing it. The bibliography of the subject is remarkably full, embracing nearly 1,000 titles, and an appendix gives a list of the plants with descriptions of many of them. The monograph is the most comprehensive study of the whole subject that has yet been written and is a gratifying contribution to this phase of physical geography. The photo-engravings are illuminating. The black sketch maps (1:1,000,000 and 1:4,000,000) show the basins of the upper Nile and its tributaries in which the phenomenon is observed.

Au Tchad. Trois Ans chez les Senoussistes, les Ouaddaïens et les Kirdis. (2nd Edition). By Capitaine Cornet. 325 pp. and 26 photo-engravings. Plon-Nourrit & Co., Paris, 1910. Frs. 4.

Captain Cornet has been one of the foremost of the French military pioneers in the region of Lake Chad among the fanatical followers of Islam. He has had a very prominent part in the difficult task of establishing the French régime among these peoples, a work that is now practically concluded; and we may now expect the beginnings of some progress there along modern lines. With security for the people, the abolition of the slave chase and the development of agriculture and stock raising, there is promise of better times for these natives of the Central Sudan, whether France profits much or little by the transformation.

This book includes the simple diary of Capt. Cornet, written in his tent after the day's events, which were sometimes particularly stirring. He tells of his hunting adventures, his combats, his perilous journeys, the chiefs he met and he sketches the Sudanese, giving graphic descriptions of their ways of life, their ideas, the motives that actuate them, their industries and trade. On the whole, the book gives us a good idea of what he saw and learned and concluded about an almost unknown part of the world during the three years that he was in the front of French activity there.

ASIA

Fifty Years of New Japan. (Kaikoku Gojūnen Shi.) Compiled by Count Shigénobu Okuma. English version edited by Marcus B. Huish. Two Volumes. Vol. I: xi and 646 pp.; Vol. II: viii and 616 pp., 5 Appendixes, Map, and Index. E. P. Dutton & Co., New York, 1909. $7.50.

The book is a record of the fifty years subsequent to the opening of Japan to foreign intercourse, and in this English edition the information is carried as near to date as public statistics allow. The foremost contemporary authorities of Japan have combined to write each, on the departments of their particular activity and experience, and, as in order to better understand the present, it has in most chapters been necessary briefly to trace the conditions of the past, this narrative of New Japan is, at the same time, a résumé of the whole history of Japan from the earliest times to the present day. Those who still cling to the opinion that the "Europeanization" of Japan is in reality nothing but a superficial veneer underneath which the radically different character of the people is concealed, will have to readjust their judgment after having read this book. It is not because the combined efforts of the distinguished authors—all of them enthusiastic believers in the New Japan, and most of them devoted ministers of the new Gospel to their people—have been successfully enlisted to convince the white reader of the possibilities of his yellow brethren. Anybody endowed with the gift of rhetoric may persuade others to share his belief; but the very way in which this record of Japan, the old and the new, or rather the old *in* the new, appeals to the western mind is in itself a proof that "the scion belonged to a genus allied to the stock," or the tree could not have borne such fruit. In fact, if we did not see the Japanese names, there is no word, no phrase, no shade of thinking in the whole book that might lead the reader to suspect that it was not an Englishman, or German, or American, or any other descendant of Old-World civilization that was speaking to him through the pages of the book. No doubt one of the contributors is right in saying that the intellectual progress

of races as well as individuals depends on what was previously known to the person or race taught. The example of Russia, 200 years after the introduction of Western civilization, when compared to Japan, fifty years after a similar change, is perhaps the best illustration of that rule. If Japan borrowed of our civilization, she also knew what to borrow, and how.

These ideas are the keynote of every chapter in the book, no matter what its subject. The authors firmly believe that there was a certain affinity, a natural preparedness in Japan that enabled her, not to imitate, but to assimilate Western civilization as soon as she had a chance. The hypothesis of an admixture of Hindoo blood is hardly necessary to explain it. The whole past of the country shows a mental disposition of the people to assimilate whatever it found that was good in neighboring civilizations; for it must not be forgotten that the exclusion policy was, in 1854, only 200 years old, that it had been caused by the indiscretion of the Jesuit missionaries then at work in Japan, and that up to that moment Japan had entertained a very lively exchange, material and intellectual, with all the nations she came in contact with, not excepting the Christian powers.

Especially from the latter they had imbibed, through the intermediation of the Dutch and Portuguese, not a little of Western philosophy and science, and even during the seclusion period there were many among the educated classes who tried, at the risk of severe penalties, to obtain for themselves and their people what little they could of Western knowledge, especially in medicine. Thus the nation was far from unprepared for the new light when dawn broke in 1854, and their inherited talent of adopting and adapting foreign blessings did the rest. After having received and assimilated the philosophies of Confucius and of Buddha, there is no reason why Japan should not as readily receive and assimilate that of Christ, and the transplantation, on Japanese soil, of European customs, science, and literature, need not endanger the nation any more than did those of China 1,500 years ago. That, with all these foreign exchanges, Japan preserved her national unity and the unity of her intellectual life is doubtless due to her insular seclusion and the favor of her soil and climate which enabled the people, undisturbed by enemies from without, and having plenty of all they needed, to lead contented and happy lives in which initial differences were gradually obliterated. It is this environment of harmony and contentment which produced, probably, that felicitous spirit of eclecticism which taught the people to examine everything and to keep what was, for them, the best. There is no reason why this faculty of assimilation should be less strong to-day than in the past; and if to-day we still perceive, in many respects, what might be called chaotic conditions it is because the period of transition is not yet ended—not because Japan is not able to assimilate the new.

It is impossible, in a short review of such a book, to enter upon any details; a few words on the contributors and their respective subjects must suffice to give an idea of its contents. Count Okuma himself gives an abstract of the history of Japan and the views of the last Shogun on the Restoration; these are followed by chapters on the political, military, naval, financial, legal, commercial, industrial conditions by Prince Ito, Count Soyéshima, Field Marshal Prince Yamagata, Admiral Count Yamamoto, Members of Parliament, University Professors, the Mayor of Tokio, the President of the Japanese Steamship Company, the President of the First National Bank, and other authorities on the respective subjects. The second volume contains chapters on the language,

religious beliefs, culture and education in old and new Japan, the development of European and Japanese Arts and sciences, on Journalism, Social changes in new Japan, the influence of the West upon Japan, etc., by similar authors; and a conclusion by Count Okuma. Each of these articles having been composed independently of the others, it is inevitable that they should overlap in some places; but the reader who does not yet know everything about Japan will hardly consider this a defect in the book, and it becomes most interesting when the opinions of the respective authors differ from each other as, for instance, in the explanation of the motives of the Shogun in resigning his office. One who has read the book carefully will feel that he knows Japan as well as anybody can know it without having lived there. What is worth more, however, is the feeling that we take along after having read the book, a real mental kinship with those who are behind it. Admitting that they are the select few who stand at the top, a nation of still half primitive people clad in borrowed rags of foreign origin could not have provided even these few who see with our eyes, hear with our ears, and speak our language—not philologically alone, but mentally. The best guarantee for the genuineness of the spirit that animates them is, perhaps, the way in which they conceive their great problem: not as the Europeanization of Japan, but as the Japanization of European civilization. With such leaders the next fifty years will probably produce even more startling and more creditable results in the progress of Japan than those recorded in these volumes. M. K. G.

Chez les Lamas de Siberie. Par Paul Labbé. 207 pp., 38 photo-engravings and sketch map. Hachette & Co., Paris, 1909. Frs. 4.

The devotees of Buddhism in the Russian Empire are the Kalmuks of Astrakhan and the Buriats of Transbaikalia, Mongol peoples who, with the Kirghiz, are in the front rank of the Siberian natives. The form of Buddhism that the Buriats profess is that which is practiced in Tibet. There are thirty-four lamaseries in Transbaikalia and there Mr. Labbé lived for many months, improving the opportunity to make a thorough study of Lamaism in that part of the world. Quite in contrast with the treatment which European travellers have received in the lamaseries of Tibet, the Frenchman was very hospitably welcomed, his many questions were readily answered and he was permitted to take numerous photographs. He has written an instructive book about these Buddhists and their large monasteries and, incidentally, he gives a good account of Transbaikalia, a region that is destined to be the home of many thousands of Russion immigrants.

A Woman's Impressions of the Philippines. By Mary H. Fee. vi and 291 pp., and 32 photo-engravings. A. C. McClurg & Co., Chicago, 1910. $1.75.

It is a long way from San Francisco to Manila and the author fills 44 pages with the story of the journey. It is the commonplace of the globe-trotter, and those who wish may skip it for the instructive and entertaining pen-pictures that fill the remainder of the volume and make it well worth while. The book is an account of native life, and its environment as seen by the author, who was long a teacher in the islands and became especially well acquainted with the middle class natives. Few of the many recent books on our new possessions give so clear an insight into the nature of the Filipinos. Its pages are enlivened,

by the way, by bright humor and by many an incident that not only illustrates a fact or idea but is, also, very comical.

Beiträge zur Kenntniss der Eiszeit in der Nordwestlichen Mongolei und einigen ihrer südsibirischen Grenzgebirge. Von J. G. Granö. iv and 230 pp., 9 maps, 19 plates, and 18 figures in the text. *Fennia,* Vol. 28, No. 5, Helsingfors, 1910.

The geomorphological studies, the results of which are recorded in this monograph, were made by Prof. Granö in 1905-07 and 1909. At a time when the study of the Ice Age in Europe and America is so far advanced, this notable contribution to similar studies in a part of Asia where questions of glacial geology have not yet been answered will be read with interest.

Les Indes Néerlandaises. Par Antoine Cabaton. viii and 382 pp., map and index. E. Guilmoto, Paris, 1910. Fr. 8.

A clearly written, readable and precise account of the Dutch East Indies. The book should be useful in wide circles for there seems to be no other work that serves precisely the same purpose. Most summaries of considerable parts of the world are dry as dust but this work does not belong to that category. It is a book not merely for reference and study but for general reading and it contains the quintessence of many years of research by many investigators, official and otherwise, as to these wide-strewn islands, their geology, geography, peoples, resources, communications, tradé, development, government, etc. Each topic is sufficiently amplified to give a good idea of it in its most important bearings.

Chez les Jaunes. Japon, Chine-Manchourie. Par Jules Leclercq. 301 pp. and 16 photo-engravings. Plon-Nourrit & Co., Paris, 1910.

Mr. Leclercq, former President of the Royal Belgian Geographical Society, is a great traveller who has written many volumes describing various parts of the world as he has seen them. There is no flavor of the globe-trotter about this or his earlier narratives, for the information he gives is worth while, well compacted and, at the same time, of very readable quality. No one can read such chapters as those on Hankow, Peking and the railroad connecting them, without receiving clear and accurate impressions that will linger in the memory.

EUROPE

In Unfamiliar England. A Record of a Seven-Thousand-Mile Tour by Motor of the Unfrequented Nooks and Corners, and the Shrines of especial Interest in England; with incursions into Scotland and Ireland. By Thos. D. Murphy. vii and 390 pp., Illustrations in color and from Photographs, 2 maps and Index. L. C. Page & Co., Boston, 1910. $3.

This is the record of an automobile trip through unfrequented nooks and corners of England made by the author. His itinerary is extensive, 7,000 miles in one summer, in all parts of the United Kingdom. So much, of course, can be seen during such a trip that an author is in danger of losing the perspective of his story in a mass of detail. Such seems to be the trouble with this account, which fails to leave on the reader's mind a picture at once coherent and entertaining. Scattered through the book are many bits of anecdote and adventure,

but the writer has tried to see too much, or to tell too much, and the reader sees only a confused vision of hilly roads, vanishing castles, and more or less hospitable inns. It may be that English landscape in itself is hardly well suited to so speedy a means of travel. Much of the delicacy of the picture must inevitably be lost on the motorist, which the pedestrian, for instance, would see and enjoy. It may be set down as an axiom of travel that the distinctness of the impression is in inverse ratio to the speed of progression. English scenery is not built on the thirty-mile an hour plan.

However, the book is well illustrated with sixteen color plates after famous paintings of landscape, and with forty-eight duogravures, of which the author is justly proud. The modest preface would disclaim any intention of producing a serious contribution to geographic travel; as a motor trip, it should prove of value to those who plan a like vacation. Two sketchy outline maps assist the reader in tracing the motor's erratic course, and are drawn to combine on one chart the author's former wanderings, described in "British Highways and Byways from a Motor Car," with those of the present volume. S. A. H.

Grèce. Par Gustave Fougères. (Guides-Joanne.) lxxxv and 514 pp., 23 maps, 46 plans and 25 illustrations. Librairie Hachette & Co., Paris, 1909.

In the present edition of this standard guidebook the number of maps and other illustrations has been increased and the volume has been thoroughly adapted to the needs of the tourist of to-day, who is finding Greece more fully open to him now than it was only a few years ago. The new Hachette maps and plans fully maintain the reputation of the publishers.

Lysing Islands. Eftir Torvald Thoroddsen. [The Physical Geography of Iceland. By Torvald Thoroddsen.] Vol. 1 and Vol. 2, part i. Vol. 1, vi and 368 pp.; Vol. 2, part i, 240 pp. Sketch maps and illustrations. S. L. Möller, Copenhagen, 1907-09.

This work, when completed, will comprise the results of Dr. Thoroddsen's long studies of the physical geography of Iceland, a subject which he has made his own and parts of which he has already treated in many papers. An account of his book is reserved for its completion.

Pompeii. Painted by Alberto Pisa. Described by W. M. Mackenzie. xii and 180 pp., 20 illustrations in color, 4 in black and white and 2 sketch plans and index. A. & C. Black, London; The Macmillan Company, New York, 1910. $2.50.

A book that may be read with pleasure and profit. It is neither a guide-book nor an archæological treatise, but a scholarly and painstaking effort to describe, as far as extant materials and admissible analysis and inference will permit, the life of the old town. Such a reconstruction of Pompeii, of course, involves account and explanation of the material revealed by the excavation of the city. The fine views in colors of the ruins and the plans of the excavated quarters and of an *insula* or isolated unit of buildings, add much to the value of the book.

Au Pays de Mgr. de Laval. Par l'Abbé Auguste Gosselin. vii and 360 pp. Laflamme & Proulx, Quebec, 1910.

Eighteen letters graphicaly descriptive of what the author deemed most noteworthy in his travels in France and visits to Rome and Interlaken.

POLAR

Rapports préliminaires sur les travaux exécutés dans l'Antarctique par la mission commandée par M. le Dr. Charcot de 1908 a 1910. Dr. J. Charcot. *Comptes Rendus* de l'Académie des Sciences, 1910, pp. i-xi, 1-103.

Although Dr. Charcot's expedition returned to France in June, the preliminary report upon the studies of the past two years has already been issued. This résumé of scientific observations made on the *Pourquoi-Pas,* is thus issued to supplement the long series of beautiful monographs which have appeared discussing the scientific observations made on the voyage of the *Français.* While two summers and a winter were spent in the Antarctic, no attempt was made to attain the pole, the objects of the expedition being purely geographic and scientific. The present report outlines only, and is in the main a series of résumés of monthly journals made on board the ship.

The expedition wintered at Petermann Island, off Graham Land. During the first summer, a cruise was made along the detached land masses of West Antarctica which had been discovered by the *Belgica* and *Français* expeditions. As a result of these surveys several lands which in order from northeast to southwest have been called Louis Philippe Land, Danco Land, Graham Land, and Loubet Land, are clearly shown to be parts of a common continent whose coast land has been extended southward past Adelaide Island for between three and four degrees to a point south of the Antarctic circle. This part of the continent is separated from Alexander Land lying to the westward by some two degrees of longitude, so that the latter must now be regarded as an island perhaps 100 miles across in its greatest dimension.

The cruise of the next summer discovered land some hundred miles to the southward of Alexander Land (in lat. 70° and long. 77° W.) and the name Marguerite Bay has been given to the great bight in which Alexander Island appears to occupy the center. The most important result of the expedition was the skirting of an "ice wall' extending to longitude 126° W. in a direction nearly due west and approximating to the parallel of 70°. In this long distance land was once seen in Pierre Island (long. 92° W). Soundings along this course supplement the observations of earlier Antarctic expeditions and show that a submerged platform lies to the west of West Antarctica, though this marginal shelf has marked relief and is notably different from that which is common to the other continents. In all, about one hundred soundings were made, of which thirteen were in excess of 1,000 meters. Outside the submerged platform a great fosse was discovered, having a depth of more than 5,000 meters, and this decreased in depth toward the west.

The report is searched in vain for any clear indication of true shelf ice, though the banquise is described as being in places three meters in thickness and as giving birth to large ice blocks or floes which were more or less shattered at the moment of birth.

Gravity determinations were carried out at six widely separated stations (two in South America), and while they are not yet ready for publication, it is announced that they indicate some differences from the theoretical results based upon Helmert's formula. A seismograph was set up at the winter station for eight months and interesting observations were made.

M. Gourdon, who furnished the admirable report upon the physical geography, glaciology, and meteorology of the *Français* expedition, was again the

geologist with Dr. Charcot, and his summary of results indicates that new and interesting reports are in prospect.

The monthly summary reports are divided into seven sections, viz.:

I. History of the voyage and general monthly report by the commander.
II. Hydrographic work, astronomical, pendulum, and seismographical observations (Bongrain).
III. Tides, coastal hydrography and chemistry of the air (Godfroy).
IV. Meteorology, atmospheric electricity and physical oceanography (Rouch).
V. Terrestial magnetism, actinometry, and photography (Senouque).
VI. Geology and glaciology (Gourdon).
VII. Zoology (Lionville).

The report is concluded by a series of meteorological tables and a list of soundings. W. H. Hobbs.

Roald Amundsen's "The North West Passage." Being the Record of a Voyage of Exploration of the ship "Gjöa", 1903-1907. By Roald Amundsen. With a Supplement by First Lieut. Hansen, Vice-Commander of the Expedition. 2 Vols. xxii and 732 pp., 139 illustrations. 3 maps, supplement and index. E. P. Dutton & Co., New York, 1908.

The popular account, finely produced, of Amundsen's famous Arctic expedition, whose results have been summarized in earlier volumes of the *Bulletin*.

GENERAL

The Conquest of the Air. By A. Lawrence Rotch. 192 pp., 36 illustrations and index. Moffat, Yard & Co., New York, 1909. $1.

Mr. Roach was the founder and is the Director of the famous Blue Hill Meteorological Observatory. No one could be better qualified than he to write the chapter on "The Ocean of Air," which opens the book and in which he shows the interdependence of meteorology and aëronautics. In the other chapters he gives thirty pages to the history of aërostation, forty-eight to a description of the varieties of the dirigible balloon, forty-one to the flying machine, and twenty to the future of aërial navigation, in the light of expert and conservative opinion. He believes that the dirigible balloon has nearly reached the limits of its development and enumerates seven particulars in which improvements in the flying machine are necessary. The perusal of this clearly written and authoritative little book will add to the intelligent interest of the millions who will have an opportunity, in the next few years, to watch the flights of air-ships.

Soil Fertility and Permanent Agriculture. By Cyril G. Hopkins, Ph.D. xxiii and 651 pp., 14 illustrations, appendix and index. Ginn & Co., Boston and New York, 1910. $2.75.

All who have to do with the production of farm crops should use this book. It is somewhat technical, as really good books of this kind must be, but anybody of ordinary common sense and intelligence will understand the book if he will study it. It is packed with facts and principles, deals largely with soil investigations by culture experiments, treats of the essential factors of success in farming, gives statistics of agricultural products and bestows adequate atten-

tion upon every phase of questions relating to soil fertility and the science of increasing the productivity of the land while, at the same time, drawing heavily upon its resources. The author is Professor of Agronomy in the University of Illinois.

Fungous Diseases of Plants. With Chapters on Physiology, Culture Methods and Technique. By Benjamin Minge Duggar. xii and 508 pp., 240 illustrations and index. Ginn & Co., Boston, 1909. $2.

This important work is the first book on the subject of American origin. The author is Professor of Plant Physiology in Cornell University. His book is designed for reference use and as a text in the higher schools. It has already been adopted in a considerable number of these institutions. Each disease is discussed as to its occurrence, the nature of the injuries induced, the structure, life history and cultural relations of the causal fungus and practical methods for prevention or control.

Meteorologie. Von. Professor Dr. Wilh. Trabert. Small 8vo. (Sammlung Göschen, No. 54.) Dritte verbesserte Auflage. G. J. Göschen, Leipzig, 1909. 80 Pf.

We are glad to welcome the third edition of Trabert's excellent little volume. The first edition appeared in 1896; the second in 1901. The author has revised the text in order to keep pace with the rapid advance in the science of meteorology, and we note particularly the sections which deal with the vertical decrease of temperature, and with atmospheric electricity. It is safe to say that the careful student of the book will gain a very good idea of the general principles of the science. We commend the book to American readers.

R. DEC. W.

Life of Admiral Sir Leopold McClintock. By an Old Messmate, Sir Clements Markham. viii and 370 pp., portraits, maps, illustrations, appendices and index. John Murray, London, 1909. 15s.

The story of one of the great heroes of British exploration, written by the geographer and Arctic authority, who, probably, was best qualified to render this service to McClintock's memory. The man whose life is here told had natural gifts that enabled him, as an explorer, to strike out new paths and accomplish results by ways of his own devising. The world at large has known him chiefly for his voyage on the *Fox* and his discovery of the fate of Sir John Franklin. In this volume we have not only the history of his achievements but gain also an insight into the facts of his development and the training that helped to fit him for a conspicuous career.

Causal Geology. By E. H. L. Schwarz, A.R.C.S., F.G.S., Professor of Geology at the Rhodes University College, Grahamstown, South Africa. vii and 248 pp., 34 illustrations or figures, and index. Blackie & Son, Limited, London, and D. Van Nostrand Company, New York, 1910. $2.50.

In a series of uncommonly interesting chapters, Professor Schwarz develops his views in regard to some of the most important geological problems. We are invited at the outset to consider five postulates: 1, The rocks on the surface of the earth are in constant motion; 2, The force of cohesion in rocks is insufficient to keep them rigid when in large masses; 3, The area of the surface

of the globe is not a diminishing one; 4, The surface of the earth is uniform in average texture throughout; 5, The earth is growing by the addition of meteoric matter, and the composition of the earth as a whole is represented by the average composition of this matter. The subject of the second chapter is the source of the earth's rocks. Other leading topics to which the author devotes entire chapters are: The building of the earth, water and the work of surface water, the soil, the atmosphere, the work of underground water, heat, earth folds, the earth's surface, pressure, cold volcanoes, normal volcanoes, earthquakes, the Archæan rocks; and in chapter xvii we find a summary that concludes with these words:

"Although we have in this book dealt with almost all the large problems in geology, we have in no one case found that the explanation of the cause for the production of the phenomena could be helped in any way by the assumption of a hot interior of the globe. The facts observed in the field or recorded observations explain, without bringing in any unknown factors, the whole of the causes which produced them, if they are allowed to range themselves in proper order. In no one case have we called in the aid of pure speculation, such as the nebular hypothesis. In all cases we have endeavored to arrive at our explanations in the simplest possible way; thus, if meteorites do fall on the earth, it is surely legitimate to take them as average samples of the interstellar matter out of which our earth has grown. Then, when we find that when the volcanic pipes dip sufficiently deep in the earth the same material comes up to the surface, there is enough proof to establish the definite conclusion that the earth's interior must be unaltered meteoric material. If I may use an illustration from the history of literature, the present work constitutes an appeal for a return to rationalism after a period of romanticism. I use these terms in the sense in which they are applied in literary criticism. I do not mean that the theoretical enigmas with which geology is burdened at the present time are pure romance, but that the dominant factor has been theoretical conceptions which have had no basis in fact, and that the fundamental theories of modern geology stand in the same relation to logical deduction from facts as romanticism stands to rationalism in the domain of literature."

We think that many readers will turn with special interest to the brief account of the radium content of rocks, and the following deductions:

"From Joly's figures there can be no doubt left in one's mind that radium has at any rate a very great influence on the temperature observed in rocks, if it is not entirely responsible for all of the heat in the earth's crust. But the work of Strutt [R. J. Strutt, "On the Distribution of Radium," etc., *Proc. Roy. Soc.* Ser. A. vol. *lxxvii*, 1906, p. 479], who initiated this kind of research, is still more positive . . ."

"The heat of the earth's crust we ascribe to the presence of radio-active substances, which, if estimated at radium alone and existing generally only in quantities such as rocks poor in radium indicate, would require an envelope of 45 miles of rock-containing radium. If the radium content of the crust be estimated a little higher, an envelope of 20 or 30 miles would be sufficient. But besides radium, there are the continual movements in the earth's crust, caused by the weighting of the crust by sediments and the lightening of continental regions by the carrying away of rock-waste; these differential movements cause the segments of the earth's crust to move and to rub one against the other, and consequently heat is developed."

Professor Schwarz ascribes the deductions in this work which differ from accepted explanations to his long-sustained association with geological phenomena in the field; and he calls attention to the circumstance that geological problems are presented to the student in an exceptional way in South Africa, or the regions which were the scenes of the activity of the Geological Commission of the Colony of the Cape of Good Hope. Practically the whole country is bare of soil, and enormous gashes sawn through the land by the rivers reveal very large sections and reveal them very clearly. As year after year went by in such "association," the facts presented themselves to Professor Schwarz in an order different from that which one usually finds in text-books, and therefore the theories as to their origin and nature became different from established ones. M. W.

A Brief History of Forestry in Europe, the United States and Other Countries. By Bernhard E. Fernow, LL.D. x and 438 pp. University Press, Toronto, 1907.

This is an authoritative reference volume for foresters and others, summarizing the forest conditions and forest management of Germany, Austria-Hungary, Switzerland, France, Russia and Finland, the Scandinavian States, the Mediterranean States, Great Britain and her colonies, Japan and the United States. Originally planned as a series of lecture notes, it is concise, closely written and hence especially valuable as a reference volume, in spite of the absence of an index.

The larger chapters are devoted, as would be expected, to Germany and the United States. While Germany has had a forest policy since the 14th Century, there was no developed public opinion in reference to the need of forest control in this country until within very recent years. In certain areas, early efforts were made to care for the forests, but they were purely local and the first forestry association was formed in 1876. The chapter summarizes the movement in the United States up to 1907.

As a book for the forester, the volume is a splendid summary of national movements all over the world. It is also a valuable volume of reference for all who are interested in the pertinent and much misunderstood subject of forestry as it confronts the people of the United States. R. E. D.

The New Baedeker. Being casual Notes of an irresponsible Traveller. By Harry Thurston Peck. 352 pp. and illustrations. Dodd, Mead & Co., New York, 1910. $1.50.

The New Baedeker is a volume of conversational notes on selected foreign and American cities, written in a sort of itinerant order. The author does not pretend to give the spirit of the cities so that one may feel the personality of Berlin, Havre or Boston, but describes the items of thought or allusion that come to him in watching the details of life amid which he has been placed in his travels. These running comments are often amusing, occasionally picturesque, but frequently far-fetched and unattractive.

The volume contains little information that would help a traveller and thereby illustrates the difference—hardly a sufficient word—between the New Baedeker and the invaluable Baedeker which is world-known and world-used. R. E. D.

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AMERICA

SOUTH AND CENTRAL AMERICA. Anonymous Italian Map of South and Central America. About A.D. 1513. No scale. From the Original in the British Museum. Black. With paper "The Discovery of the North Coast of South America," by Dr. J. Denucé. *Geogr. Journ.*, vol. 36, p. 128, 1910.

BOLIVIA-PERU. South Peru and North Bolivia. Including the rubber yielding Montaña. 1:2,000,000=31.56 miles to an inch. 4 colors. With paper, "The Land of the Incas," by Sir Clements R. Markham. *Geogr. Journ.*, vol. 36, p. 512, 1910. [Compiled in the map department of the Royal Geographical Society. The map embraces about 418,000 square miles and most of the material was map sketches or route traverses. The compilation and drawing of the map took the greater part of two years.]

BRAZIL. Vorläufige Skizze zu Col. Candido Rondons Expedition Cuyabá nach dem Madeira. 1:7,500,000=118.37 miles to an inch. 2 colors. With paper, "Col. Candido Rondons Expedition im Brasilischen Hinterlands," by H. Wichmann. *Pet. Mitt.*, 56 Band, Heft V, Tafel 47, 1910.

PANAMA CANAL. *Stand der nordamerikanischen Arbeiten am Panama-Kanal.* Mitte 1909. 1:150,000=2.38 miles to an inch. 4 colors. *Pet. Mitt.*, 56 Jahrg. II Halbband, 1 Heft, Tafel 7, 1910. [Based upon the publications of the Isthmian Canal Commission.]

PERU. Der Mittel-und Unterlauf des Ucayali mit seinen Zuflüssen. (a) Nach A. Raimondi's Karte von Peru 1887 in 1:500,000 und der Karte von Pedro Portillo, 1907 in 1:1,000,000; (b) Nach der Aufnahme von Richard Payer, 1886. 1:1,500,000=23.67 miles to an inch. With paper, "Vom Ucayali nach den Bergen von Condamana." *Pet. Mitt.*, 56 Jahrg., II Halbband, 1 Heft, Tafel 8, 1910.

PERU. Das Quellgebiet des Amazonas-Marañon. 1:1,000,000=15.78 miles to an inch. By Dr. Wilhelm Sievers. Black. With paper. "Die Quellen des Marañon-Amazonas." *Zeitsch.* f. der Gesells. f. Erdk. zu Berlin, No. 8, Tafel 7, 1910. [Sketch map of the source region. Dr. Sievers locates the ultimate source of the Marañon-Amazon on the snow mountain San Lorenzo about 10° 29′ S.; 36° 37′ W.]

VENEZUELA. Karte der Umgebung von Caicara in Venezuela. 1:250,000=3.95 miles to an inch. By T. A. Bendrat. 4 colors. Geol. profile of Orinoco river bed at and near Caicara. With paper, "Studien in der Umgebung von Caicara am Orinoko," same author, *Pet. Mitt.*, 56 Band, Heft V, Tafel 46, 1910. [Based on Bendrat's astronomical and trigonometrical observations.]

AFRICA

AFRICA. Eisenbahnen und Wasserstrassen in Afrika. 1:25,000,000=394.5 miles to an inch. 3 colors. With paper, "Transkontinentale Bahnen und die Kap-Kairo-Linie," by Dr. R. Hermann. *Geogr. Anzeiger,* II Jahrg., Heft ix, 1910. [Shows R.R.s in operation, building and planned and the navigable stretches of rivers. A good map though it fails to show the R.R. now extending into Northern Nigeria; nor does it indicate as navigable the upper Lualaba-Congo though the Belgians report that it is navigable for 400 miles (light draught vessels) above Kongolo.]

ALGERIA-MOROCCO. Schauplatz zukünftiger französisch-marokkanischer Verwicklungen an der algerisch-marokkanischen Grenze. 1:2,500,000=39.46 miles to an inch. 3 colors. With paper, "Militärgeographische Skizze der algerisch-marokkanischen Grenzgebiete," by D. Hübner. *Pet. Mitt.,* Band 56, Heft V, Tafel 49, 1910.

BELGIAN CONGO. Part of the Kasai Basin. 1:1,500,000=23.67 miles to an inch. By E. Torday. 2 colors. With paper "Land and Peoples of the Kasai Basin" by same author. *Geogr. Journ.,* vol. 36, p. 128, 1910.

IVORY COAST. Carte politique de la Côte d'Ivoire. Montrant la marche de la pénétration et de la pacification depuis le 1er mai, 1908. 1 inch=71.3 miles. Black. With paper, "La Pacification de la Côte Ivoire." *Renseign. Col.,* No. 10, 1910. [Symbols show the regions under the French régime and those still to be explored and pacified.]

NIGERIA-CAMEROONS. Nigeria-Cameroons Boundary Survey, Yola-Cross River. 1:1,000,000=15.78 miles to an inch. Reduction from Boundary Commission Map, 1907-09. 3 colors. List of trigonometrical stations giving their coordinates and elevations. With paper, "The Yola-Cross River Boundary Commission, Southern Nigeria," by Major G. F. A. Whitlock, R.E. *Geogr. Journ.,* vol. 36, p. 512, 1910. [An inset chart shows the triangulation.]

PORTUGUESE W. AFRICA. South West Africa. Route of C. C. Bissett and J. W. Baker White in 1907-8. 1:1,500,000=23.67 miles to an inch. 3 colors. *Geogr. Journ.,* vol. 36, p. 248, 1910. [The map, from a prismatic compass sketch, covers the northern Mambukushu country.]

SUDAN. Route of Dr. Karl Kumm across Africa from the Niger to the Nile, 1908-1909. 1:7,500,000=118.37 miles to an inch. 3 colors. With 2 insets of parts of the route on scales of 1:1,250,000 and 1:3,750,000. With Paper, "From Hausaland to Egypt through the Sudan," by Dr. Kumm. *Geogr. Journ.,*

vol. 36, p. 248, 1910. [Shows the routes of Dr. Kumm, Capt. Boyd Alexander, and Dr. G. Nachtigal. Based upon a compass traverse adjusted to positions and surveys previously fixed.]

CENTRAL SUDAN. Captain J. Tilho's Explorations in and around Lake Chad, 1907-1908. 1:2,000,000=31.6 miles to an inch. 3 colors. With paper, "The French Mission to Lake Chad" by Capt. Tilho. *Geogr. Journ.*, vol. 36, p. 380, 1910. [Shows routes and many elevations in feet.]

TOGO. Die Togoküste 1895 und 1910. 6 maps on one sheet. Scales 1:2,000,000-1,000,000-250,000. By P. Langhans. With paper, same title and author. *Pet. Mitt.*, 56 Band, Heft VI, Tafel 57, 1910.

TROPICAL AFRICA. Die Verbreitung der Schlafkrankheit und der Tsetsefliegen im tropischen Afrika. 1:25,000,000=394.5 miles to an inch. 5 colors. *Pet. Mitt.*, 56 Jahrg. II Halbband, 2 Heft, Tafel 11, 1910. [Based upon the maps of the Sleeping Sickness Bureau, London, Oct., 1909.]

TUNIS-TRIPOLI. Das südtunesische Grenzland. Übersichtskarte zum französisch-türkischen Grenzstreit. 1:2,000,000=31.56 miles to an inch. 5 colors. With paper, "Das südtunesische Grenzland," by Lieut. Max Hübner. *Pet. Mitt.*, 56 Jahrg. II Halbband, 2 Heft, Tafel 19, 1910.

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ASIA MINOR. Durchquerungen der Bithynischen Halbinsel. 1:300,000=4.73 miles to an inch. By Dr. W. Endriss. 8 colors and tints. 2 geological profiles. With paper, same author and title. *Pet. Mitt.*, 56 Jahrg., II Halbband, 4 Heft, Tafel 31, 1910. [Gives the results of geological surveys by the author and earlier explorers in the northwestern peninsula of Asia Minor.]

CHINA. Routes of the Imperial Russian Geographical Society's Expedition in Kan-su and Mongolia under the command of Col. P. K. Koslof. From a survey by Capt. Napalkof. 1:4,000,000=63.13 miles to an inch. 3 colors. With paper, "The Mongolia-Sze-chuan Expedition," by Col. Koslof. *Geogr. Journ.*, vol. 36, p. 380.

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CHINA. Part of Southern Se-chuan (Lololand). 1:1,000,000=15.78 miles to an inch. By W. N. Fergusson. 3 colors. *Geogr. Journ.*, vol. 36, p. 512, 1910.

CHINA. Rundreise des Kaiserlich Deutschen Konsulatsverwesers von Chengtu-Chunking in Sze-chuan. Von Konsul Weiss. 1:500,000=7.89 miles to an inch.

Inset of his route from Chengtu in 1:3,000,000. With paper, "Reise durch die Eingeborenenstaaten in Westszetschuan, Sept.-Nov., 1908." *Pet. Mitt.*, 56 Jahrg., II Halbband, Tafel 12, 1910. [Gives new data for the mapping of this region.]

DUTCH EAST INDIES. Reisewege der Frankfurter Sunda-Expedition, 1909-10. (a) Reisewege auf Südost -Celebes. 1:2,000,000; (b) Reisewege auf Soembawa. 1:1,000,000. 3 colors. By Dr. J. Elbert. With paper, "Bericht über die Elbert-Sundaexpedition," by Dr. B. Hagen. *Pet. Mitt.*, 56 Band, Heft. VI, Tafel 52, 1910.

INDIA. Explorations in the Eastern Karakoram. 1:500,000=7.89 miles to an inch By T. G. Longstaff. 4 colors. Illustrations 'Glacier Exploration in the Eastern—by same author. *Geogr. Journ.*, vol. 35, p. 744, 1910. [Map based on fixed points of the Survey of India.]

SIAM-BRITISH MALAY PENINSULA. Le Chemin de Fer de Bangkok à la Malaisie britannique. No scale. Black. With paper, same title, *L'Asie Française*, No. 113, Aug., 1910. [Shows completed and unfinished parts of the R.R. line to connect Bangkok with Singapore.]

SIBERIA. Tiefenkarte des Baikal-Sees. 1:1,500,000=23.67 miles to an inch. 6 blue tints. 3 profiles. With paper, "Der Baikalsee" by Prof. Dr. A. Woeikow. *Pet. Mitt.*, 56 Band, Heft VI, Tafel 51, 1910. [From the Russian original which was based on the work of the Hydrographic Expedition to Lake Baikal in 1896-1902.]

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GERMANY. Höhenschichtenkarte der Lüneburger Heide. 1:200,000=3.1 miles to an inch. Von Dr. Konr. Olbricht. Inset: Höhenlage der altdiluvialen Schichten in Meter. 1:750,000. 10 tints for contours of elevation. 4 profiles through the Heath. With paper, same title and author. *Pet. Mitt.*, 56 Jahrg., II Halbband, 3 Heft, Tafel 21, 1910.

GREECE. Die Kykladeninsel Donusa. 1:75,000=1.18 mile to an inch. 6 colors and tints. With paper, "Zur Kenntniss der Kyklade Donusa." *Pet. Mitt.*, 56 Jahrg. II Halbband, 3 Heft., Tafel 26, 1910.

ICELAND. (a) Der Langjökull auf Island. 1:600,000=9.4 miles to an inch. By Th. Thoroddsen. (b) Thórisdalus und Südrand des Langjökull. 1:300,000= 4.73 miles to an inch. By L. Wunder. With paper, "Beobachtungen am Langjökull und im Thórisdalur auf Island," by Lieut. Wunder. *Pet. Mitt.*, 56 Jahrg., II Halbband, 3 Heft, Tafeln 22, 23, 1910. [Routes, glaciers, geology, etc., in colors.]

MACEDONIA. Die Oberfläche Mazedoniens. Skizze der Anordnung der Faltungsgürtel auf dem Rumpfe der Süd Ost Halbinsel. Nach Cvijic. No scale. Black. With paper, same title, by K. Oestreich. *Geogr. Zeits.* 16th Jahrg., 10th Heft, Tafel 8, Leipzig, 1910. [Black symbols show the geology and distribution of the surface forms.]

MONTENEGRO. Die räumliche Entwicklung des Königreichs Montenegro. Nine maps on one sheet. 1:1,500,000=23.67 miles to an inch. Zusammengestellt von Paul Langhans. 5 colors. With paper, same title, by Prof. Dr. K. Hassert. *Pet. Mitt*, 56 Jahrg., II Halbband, 3 Heft, Tafel 20, 1910. [Shows the territorial extent of Montenegro about A.D. 1400 and in 1820, 1838, 1855, 1860, 1878 (before the peace of S. Stefano), 1878 (according to the Berlin treaty), 1880 and 1910 when, on Aug. 28, Montenegro became a kingdom.]

RUSSIA. Die Verbreitung der Hausgewerbe im Daghestan. 1:700,000=11 miles to an inch. By Dr. A. Dirr. 3 colors. With paper (same title and author) in *Pet. Mitt.*, 56 Band, Heft VI, Tafel 50, 1910.

SPAIN. Die Herdenwanderungen in Spanien. 1:3,700,000=58.3 miles to an inch. 5 colors. Nach A. Fribourg. With note, same title, by O. Quelle. *Pet. Mitt.*, 56 Jahrg., II Halbband, 2 Heft, Tafel 17, 1910. [The data are taken from 2 maps by Fribourg in *Ann. d. Géog.* (vol. xix, 1910), illustrating the movements of sheep in Spain between higher and lower altitudes, according to changes in pasturage as affected by climatic conditions.]

AUSTRALASIA AND OCEANIA

AUSTRALIA. Reduced Survey Map of Australia. Revised Edition. 1:6,000,000=94.6 miles to an inch. By J. G. Bartholomew. In colors. Insets of Melbourne, Sydney, Brisbane, Adelaide, Hobart and Perth on large scales. John Bartholomew & Co., Edinburgh, 1910. 2s. net. [An excellent map of the continent with large nomenclature produced in the best style of this map house. Each county in the several states is bounded and named, cable lines, telegraphs and steamer routes are given and the railroads are differentiated as in operation or in course of construction. The hill features are shown by hachures. The railroad from Port Augusta, which is to be carried west to Kalgoorlie, thus completing the east and west transcontinental line, is shown according to the survey of the Commission that has recently completed that work. The whole map is legible and the plans of the leading towns and ports add much to its value.]

AUSTRALIA. (a) Victoria. 1 inch=30 miles. Black; (b) Map of Queensland. 1 inch=75 miles. Colors. [Shows the railroads, towns and distribution of live stock]; (c) Map of Western Australia. 1 inch=90 miles. Colors. 1910. [Colors show lands held under pastoral leases and areas in which agricultural lands are open for selection. An inset shows prevailing varieties of trees in the timber areas]; (d) New South Wales. 1 inch=50 miles. Black. [Shows railroads and principal roads.] Illustrate "The Yearbook of Australia, 1910."

SOUTH AUSTRALIA. Map of the southern portion of Southern Australia. 1 inch=16 miles. In "The Year-Book of Australia, 1910."

NEW GUINEA. Versuch einer seismo-tektonischen Skizze des Schutzgebietes Deutsch-Neu-Guinea (Kaiser Wilhelms-Land und Bismarck-Archipel). 1:10,000,000=157.8 miles to an inch. By A. Sieberg. 16 colors and tints. With paper, "Die Erdbebentätigkeit in Deutsch-Neuguinea, same author. *Pet. Mitt.*, 56 Jahrg., II Halbband, Tafel 15, 1910. [Shows observation stations, volcanoes, volcanic line, earthquake areas differentiated as to relative intensity of shocks, and 10 tints indicate sea depths.]

NEW GUINEA. Küste des Kaiser Wilhelmlandes von Eitapé bis Aróp. 1:100,000=1.5 mile to an inch. 5 colors. With paper, "III. Zur Kenntniss des Kaiser-Wilhelms-Landes und einiger Neuguinea und Neupommern vorgelagerten Inseln," the conclusion of Prof. Dr. Karl Sapper's papers on the explorations of Dr. G. Friederici. *Pet. Mitt.*, 56 Band. Heft V, Tafel 44, 1910. [Shows Friederici's route along the coast with many place names he obtained.]

NEW GUINEA. KAISER WILHELMSLAND. (a) Reise von Eitapé längs der Küste nach Hollandia. Aufgenommen von Dr. G. Friederici, Dezember, 1909; gezeichnet von Prof. Dr. K. Sapper. 1:300,000=4.73 miles to an inch. 4 colors. Inset: Skizzé des Pfahldorfes Leitere im Barai. 1:20,000. [A survey of the extreme western part of the northern coast of Kaiser Wilhelmsland]; (b) Reise

in das Hinterland von Eitapé. By Dr. G. Friederici. 1:50,000=0.79 mile to an inch. 4 colors. With paper, "In das Hinterland der Nordküste des Kaiser Wilhelmslandes (Neuguinea)" by Dr. Friederici. *Pet. Mitt.*, 56 Jahrgang, II Halbband, 4 Heft, Tafeln 34, 35, 1910.

SAMOA. Regenkarten von Deutsch-Samoa. 1:500,000=7.89 miles to an inch. 2 colors. With paper, same title, by Dr F. Linke. *Pet. Mitt.*, 56 Jahrg., II Halbband, 3 Heft, Tafel 24, 1910. [Three maps with isohyetal curves showing rainfall in centimeters for year, January and July.]

INDIAN OCEAN. Chart to illustrate a paper on Aldabra and neighboring Islands. 1:5,000,000=78.9 miles to an inch. Insets of Aldabra, Assumption, Astove Is. and Cosmoledo Group in 1:250,000. By J. C. F. Fryer. Black. With paper, "The South West Indian Ocean" by same author. *Geogr. Journ.* Vol. 36, p. 380, 1910. [Many soundings in fathoms and qualities of sea floor indicated.]

POLAR

SOUTH WEST GREENLAND. (a) Jakobshavner Eisfjord und Tasiussak, 1:150,000; (b) Torsukatak und Ikarasak, 1:225,000. Mit benutzung von älterer Karten aufgenommen 1902-1904 von Dr. M. C. Engell. 3 colors. With paper, "Zur Kenntniss der Fjorde Grönlands," by Dr. Engell. *Pet. Mitt.*, 56 Band, Heft VI, Tafel 54, 1910.

ARCTIC REGIONS. Sketch Map to illustrate the Expedition of Comm. R. E. Peary, U. S. N., 1908-1909. 1:25,000,000=394.5 miles to an inch. 3 colors. With profile of soundings from Cape Columbia to the Pole. Illustrates paper, "Peary Arctic Club Expedition to the North Pole, 1908-09" by Comm. Peary. *Geogr. Journ.*, vol. 36, p. 248, 1910. [The map makes the northern and southern routes of Peary, to and from the Pole, as identical, which, according to his report, is practically correct, though the map in his book shows them as diverging from the Pole southward.]

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NORTH AMERICA

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